COAL AGE

A McGRAW-HILL PUBLICATION

NOVEMBER, 1958

Export Outlook ..... p 74
Continuous Mining ..... p 78
Whither Coal? ..... p 96

PRICE $1

Jet Loading — p 86 Ammonium Nitrate — p 104

A variety of expert skills are tapped to equip MSA instruments with the precision and sensitivity so essential to protecting miners' lives underground.

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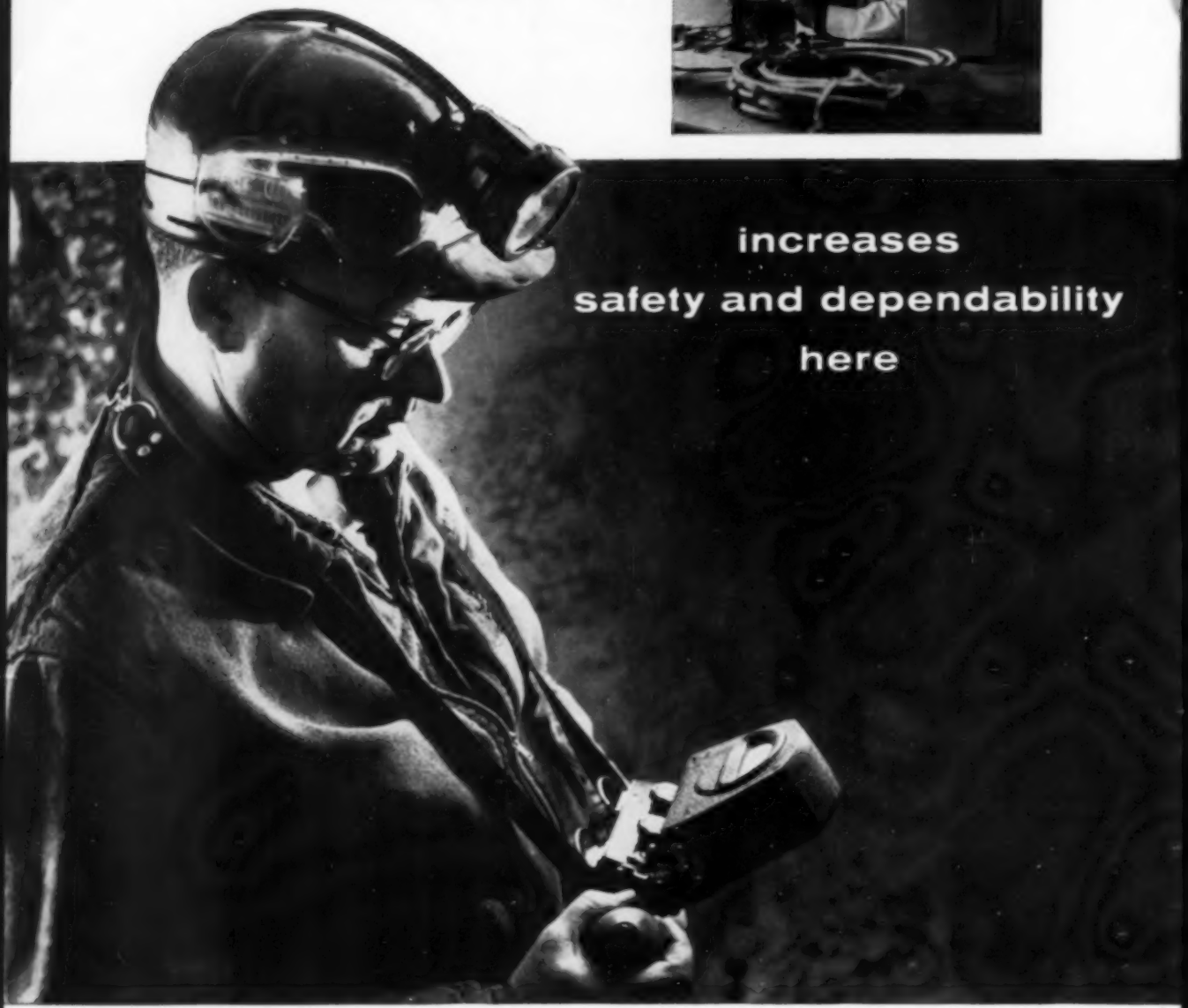

increases safety and dependability here

Miner squeezes hand-bulb, draws in air sample, and amount of methane registers in seconds on easy-to-read dial of M-S-A Methane Detector Type W-8.

M-S-A® Methane instruments provide working crews with a wide range of safety checks

M-S-A METHANE DETECTOR TYPE W-8 shown above, gives instant, accurate reading of methane. It's light and portable. Has two scale readings for greater accuracy—0 to 2% and 0 to 5%.

M-S-A METHANE TESTER TYPE M-6 is also available. This pocket sized unit indicates methane as low as .2%. It's new, small, streamlined. Edison Electric Cap Lamp battery provides dependable power. Connects and disconnects easily with battery.

M-S-A WOLF JUNIOR FLAME SAFETY LAMP is made of lightweight aluminum. Always a dependable steady flame, guarded by improved ventilation. Easy to read, standard size graduated chimney.

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An M-S-A representative will be pleased to discuss the safety aspects of these instruments in relation to your operation. Get in touch with him soon or write us for detailed bulletins.

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MSA
SAFETY EQUIPMENT HEADQUARTERS

B.F.Goodrich

It's a stomach pump for a coal mine

B.F.Goodrich improvements in rubber brought extra savings

Problem: Getting rid of pools of water that collect in this coal mine is a constant job. Let it accumulate, and in just a few days enough water could pour in to flood the underground pumps, damage machinery, close the mine down. At first, iron pipe was used to drain the pools. But the water contains acid that eats holes in metal. Flexible rubber hose, reinforced with wire, was tried, and worked fine until it was run over several times and crushed flat by heavy mining equipment.

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Savings: Since 1953, B.F.Goodrich water hose has worked night and day to keep this mine dry. It has gulped millions of gallons of acid water, been run over countless times by shuttle cars and other equipment. But despite the abuse, it lasts four times longer than the hose used before, saves an estimated 75% in maintenance costs.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose described here. And, as a factory-trained specialist in rubber products, he can answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Dept. M-464, Akron 18, Ohio.*

B.F.Goodrich *industrial rubber products*

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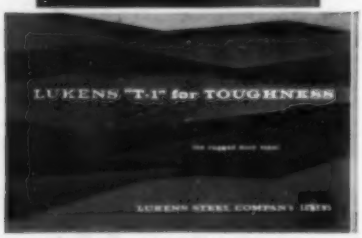
Contact your nearest warehouse listed below, or write Manager, Marketing Service, 140 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania. Ask for special bulletin, *"Lukens 'T-1' for Toughness."*



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Easier, faster to extend!

Easier, faster to operate!

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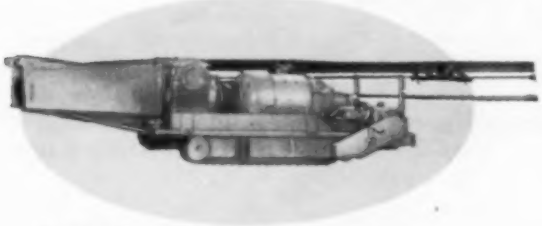
For details on the Lo-Rope Belt Conveyor, write us today. Or better yet, install a test section of Lo-Rope the next time you make a belt extension and learn first hand why it works better with less work.



LONG Belt Conveyor Mobile Drive Units

Self-tramming for easy moves. Available in units up to 40 HP with either snub or tandem drive units for use with Lo-Rope or any other type of belt conveyor.

The LONG Company
Oak Hill, W. Va.

and get it drier at lower cost per ton

This Bird Solid Bowl Centrifugal is the complete answer to the problem of dewatering fines from thickeners, cyclones or flotation cells.

It does a better job than vacuum or gravity, *at less cost.*

The coal comes out 5 to 15% drier, and recovery is practically 100%.

Fluctuating volume of feed or changes in feed consistency do not throw the Bird off stride.

Maintenance is at a minimum.

Ask us to figure the net savings as they apply to *your* minus 28 mesh coal.

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This Month in COAL AGE

NOVEMBER 1958

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►Coal Exports

High Exports Still Firm ..... p 74

W. A. Raleigh Jr., Associate Editor, and Overseas Correspondents *Coal Age*

What's ahead for U.S. coal exports? Reports from five European countries, which buy 86% of all U.S. coal sold in Europe and account for 73% of total overseas coal trade, show that factors supporting the permanency of high-level overseas trade have not changed. Between now and 1965, total permanent overseas market for U.S. coal should level off at from 35 to 40 million net tons per yr. Demands for U.S. metallurgical will remain non-competitive and fairly steady. However, a buyer's market has arrived in steam coals. Higher charter rates will lead to increased competition from Poland and USSR.

Special—Up-to-the-minute reports from McGraw-Hill World News on West Europe coal markets.

►Deep Mining

AC Continuous Mining At CF&I's Allen Mine ..... p 78

New production records and greater safety are two major gains noted since continuous mining began at CF&I. Average production with a Lee Norse CM37-1E AC continuous miner is 400 tons of raw coal per shift with nine men. It takes eight shifts to drive a pair of rooms 300 ft deep, including crosscuts, and another eight to recover the two rows of pillars. AC power is purchased at 44,000 V and distributed at 4,160 and 440 V from surface substations. Each section has its own 300-kva transformer that reduces voltage from 4,160 to 440 for operation of face equipment.

Highlights—Continuous mining plan in room and pillar work: details of AC power distribution system at CF&I's new Allen mine.

►Stripping

Blow Charging Ammonium Nitrate ..... p 86

Greater loading density and a significant saving in time and effort in charging horizontal blastholes are possible with use of a blow-charging machine undergoing field tests. Experiments with an Atlas Powder Co. Jetloder at Central Ohio Coal Co.'s Cumberland mine show that an 80-lb bag of ammonium nitrate can be mixed with 1 gal of fuel oil in 20 sec and then blown into a horizontal hole in 10 sec. The device also is used to tamp holes with sand at a saving of $1.60 per hole.

Extras—How the loader works; action photographs in the pit.

►Mining Law

AC Operating Regulations ..... p 92

C. L. Brown, Mining Engineer (Electrical), U. S. Bureau of Mines, Pittsburgh, Pa.

Restrictive provisions in some states discourage the use of AC power. Standardization of regulations among the states is needed if maximum benefits of AC power are to be realized by the coal industry.

Important—A tabulation of state regulations on electrical installations.

(*Continued on page 7*)

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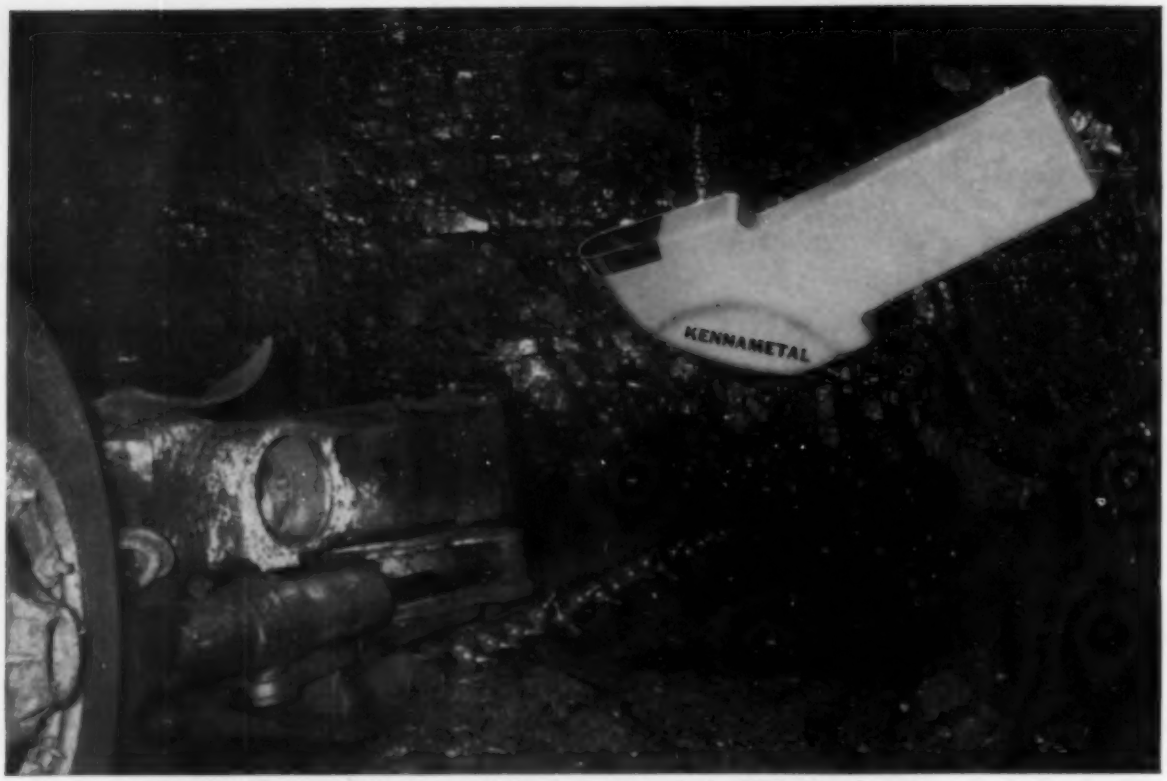


Withdrawn four feet after completing the first sump, this Joy 10RU universal cutter, equipped with Kennametal U7 bits, is in position to begin the first pass.

On the same machine . . . in the same hard cutting

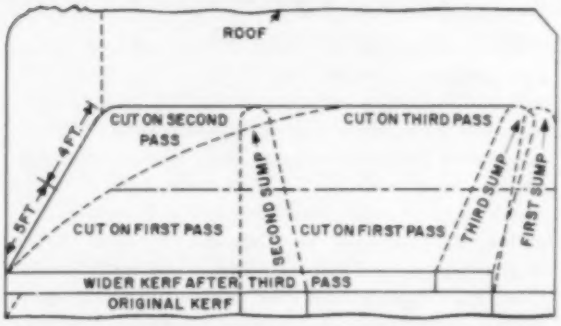
KENNAMETAL* U7 Bits reduced bit cost by 50%

Hard sulphur balls in this Indiana No. 5 Seam were holding bit cost at 6.4 cents a ton until Kennametal bits were installed. By using rugged Kennametal U7 bits, this cost was reduced to 3.25 cents a ton.

About 14 places, 26 feet wide, are cut during a normal shift, using the unique three-pass cutting method described at the right. By this procedure, found to be most efficient for the unusual conditions encountered here, a record 23 places were once cut in a single shift, using the Kennametal U7 bits.

Get more information about Kennametal "yellow bits" from your Kennametal Representative. Ask him about Kennametal's new stronger shanks for today's higher powered mining machines, or write KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

*Trademark. Company name on request. 5706



Three-pass cutting method

1. After sumping in a full nine feet along the right rib, the cutterbar is withdrawn four feet.
2. *First pass* is made across the full width of the face.
3. Cutterbar is sumped in a full nine feet at the center of the face.
4. *Second pass* cuts the four feet depth remaining at the left rear.
5. Cutterbar is again sumped in nine feet at the right rib.
6. Heel of the bar is raised ten inches.
7. *Third pass* cuts the four feet depth remaining at the right rear, continuing across left rear, widening the kerf and clearing cuttings.

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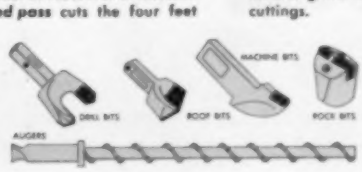


► Outlook

Whither Coal? ..... p 96

Reed Moyer, Berkeley, Calif.

A growth industry is one that develops its own markets and affirmatively shapes its own destiny. Can the coal industry qualify? To do so, coal must capture its share of the energy market in competition with fossil fuels and nuclear energy. The industry must take a strong stand against disruptive dumping of residual oil and off-season gas. Railroad support should be enlisted in this fight.

Effective research is one way to develop markets for coal. Research is not a panacea, but it is a constructive first step.

Plan of Action—A research program financed by a check-off assessment.

► Continuous Mining

Flexible Continuous Mining ..... p 100

Four Star Collieries, Ltd., of Nova Scotia, employs a Joy ripper-type continuous miner and a Wilcox auger-head unit in 48-in coal. Operations are in the Tracy seam which dips approximately 20%. The two types of machines compensate for variations in roof character and seam thickness. The Joy machine drives rooms up the pitch and slabs to final thickness on the return. The Wilcox unit works on the dip side of the level entries, driving rooms parallel to the strike.

Added—Diagram of full-pitch and cross-pitch continuous mining methods.

► Explosives

Ammonium Nitrate and Its Use As a Blasting Agent ..... p 104

Donald M. Stromquist, Technical Representative, Coal Chemical Sales Div., U. S. Steel Corp.

To improve handling and loading, Utah Construction Co. built a bulk ammonium nitrate and hydrocarbon loader. By using this loader, it is possible to load 200 to 300 lb of nitrate-oil mixture in 20 sec. A 36-ton bulk storage bin now under construction will feed nitrate to the loader. United States Steel Corp.'s Michigan Limestone Div. developed a handling system that reduced manpower requirements from 11 to 6. Another western mining concern solved the nitrate handling problem by developing an air-loading procedure.

Sidelights—How ammonium nitrate is made and how it is converted into a blasting agent.

(Continued on p 9)

This Month in COAL

CAR SHORTAGE AHEAD?—At this moment, the idea of a car shortage appears somewhat more plausible than a few months ago. This grows out of the increasing climb in the production rate, reflecting the rising trend in business, and the expectation, in some quarters at least, that bituminous output in the fourth quarter could reach 120 million tons, in turn bringing the total for 1958 up to 420 million and giving the industry a fast start toward a big increase in 1959.

Will bituminous hit 120 million in this fourth quarter, which would mean operating at an average rate of 9¼ million tons per week? The strengthening of the rate in September to around 9 million, with the final 3 mo then to go, gave real support to this view.

OIL TROUBLE—Not too many years ago the posted prices for heavy fuel oil dropped to as low as 3c per gallon in certain areas along the Atlantic Coast, and large volumes were offered at, in some instances, as low as 1 to 2c. Whether that will happen again is problematical, but the price-cutting trend that started early this year has brought the price per barrel down 66c, or equivalent to nearly $3 per ton of coal. The barge-lot price in New York Harbor in September was 5¼c per gal, or a lot closer to 3c than the early-1958 figure of 7c.

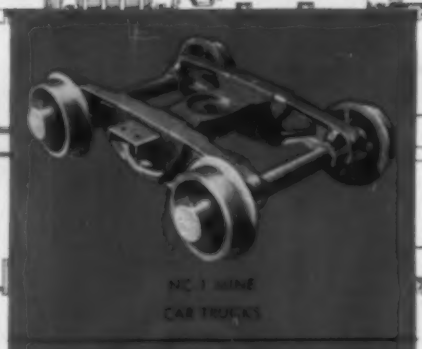
Question: Are the East Coast importers and refiners again out to try to muscle coal out of a big part of the heavy-fuel market, particularly utility? Unless pricing policy changes shortly, the conclusion is: "Could be."

AND NATURAL GAS—Just as imported oil and oil products have replaced the home-produced product and thus kept competition strong, imported gas seems to be getting into position to do the thing on that side of the fence. Canada, with one new 1½-billion-feet well in Alberta and mounting discovery of additional reserves, now looms as the possible source of imports that could affect coal markets directly or indirectly to the East Coast—unless the Dominion's fuel policy restricts dumping gas into power-plant boilers. The situation bears real watching.

AND THE ATOM—Although the AEC is proceeding at normal pace on the enlarged reactor-development program authorized in the last session of Congress, new evidence, including statements at the Second Atomic Congress in Geneva, indicate that competitive nuclear power is farther off rather than closer.

Remaining U. S. Hazard—Subsidized nuclear power, which public-power advocates will be back pushing for in the next Congress. The makeup of this next Congress may increase its leaning toward such a program and result in additional attempts to implement it.

AND THE FUTURE—All-in-all year-end developments indicate a strengthening of competition in the immediate future. The farther future is still a question and a challenge. The latter grows out of, among other things, one forecast—by economist expert in the field—that explosive population growth was likely to result in a total of 225,000,000 people in the U. S. by 1975. Another speaks of 231 million by the time 1975 rolls around. This should give coal a lot of elbow room in spite of competition.



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every day, every year more and more mine cars and locomotives are equipped with

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► Coal Utilization

Tampa Electric Chooses Coal ..... *p 110*

A. D. Jones, Mechanical Engineer, Tampa Electric Co., Tampa, Fla., and **W. E. Hopkins,** Mechanical Engineer, Stone & Webster Engineering Corp., Boston, Mass.

Tremendously increased power needs in the Tampa area forced Tampa Electric Co. to build a new power station with a planned capacity of over 400,000 kw. Extensive economic studies indicated coal to be the best all-round fuel. Coal from western Kentucky comes by barge across the Gulf of Mexico to Tampa, and also by rail. Yard storage of 400,000 tons has been provided for. One coal-handling system meets the needs of receipt and yard storage and the other meets the needs of the station itself.

Featured—Coal-handling system including unloading, storage and plant-supply phases.

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This Month in Mining Practice

AUGERING UNDERGROUND—The auger for outside use had scarcely been announced when work was started on the design of underground models. But the road was rough and little progress was made for a time, even though the principle was adapted to one short-wall-type continuous miner. Now, new designs have been made and initial tests in both anthracite and bituminous indicate good possibilities. Consequently, it is expected that the auger will join the list of tools available for mechanized underground production.

CONTRACT NITRATE SERVICE—Do-it-yourself has been the general rule in the use of ammonium nitrate to the present time. The principle, in fact, has been extended to research to improve the basic product and the techniques of using it, with at least one coal company financing a major program to determine the effects of prill-manufacturing methods, oil percentages and detonating methods on both the ease and maximum power of detonation, as well as overall cost. And in addition to study directed at improvement in product and methods there also has come the idea of contract service, with the supplier taking over the entire job of shooting from delivery to firing.

SHAFT BORING—Where depths are not too great some form of drilling can result in major savings in shaft sinking. First, of course, was the use of the pilot hole to drop muck to cars in the mine. Then came the use of big coring-type drills and also the technique of outlining the shaft area with small holes and then sinking from the top. Now, it is planned to sink 6-ft-diameter shafts with big drill bits preceded by pilot holes for automatic chuting of cuttings to transportation equipment at the foot of the holes. A major increase in sinking speed is one expected result.

COAL SALVAGE—The recent addition of several new units to the list of those reclaiming coal from cleaner refuse is evidence of continued interest and growth in this activity to supplement the almost standard practice of middlings crushing and retreatment. Formerly, most of the units operated on the larger fractions. Now they are being applied to the smaller sizes, such as refuse from air cleaners. This, among other things, permits a more efficient setting to supplement the advantage of dry separation. The test is economic, and a salvage job is not the answer in every plant. But with coal value what it is today, salvage should not be neglected in a search for economies.

NO CUREALL—The fact that three out of eight fatalities from falls in Pennsylvania bituminous mines in the first 8 mo of 1958 occurred in roof-bolted areas continues to reinforce the conclusion that bolting is no cureall, even though it has helped outstandingly. Even where no trouble has been encountered it still is a good rule to question and study support plans until everything possible has been done. Otherwise, the benefits of a good approach may be partially or completely lost by a change in conditions or failure to uncover a hidden pitfall in the system.

No. 10 in a series

Right off the Wire

A miniature record player only four by eight inches is capable of playing twelve inch records.

The record of many thousands of electrical installations shows that the use of TIREX cords and cables provides an extra measure of employee safety.

A new process removes helium from natural gas, in which it is a contaminant, by passing the gas through glass pipes, through the walls of which the helium is filtered.

An atomic-powered train has been designed that will travel across country without tracks. It has fifty-two wheels, each of which is electrically driven.

The plastic base of a new electric coffee pot completely encloses and waterproofs both heating element and thermostat.

Titanium alloyed with ranadium, chromium and aluminum makes a new alloy that is said to have the greatest strength for its weight of any structural material.

A complete picture, ready for transmission, is provided by a new transistorized television camera. It weighs only four pounds, including self-contained control and synchronizing units.

A radio telescope over four-hundred feet in diameter is planned for the hills of West Virginia.

Weather information can be transmitted over a thousand-mile range by an automatic radio station which can be dropped anywhere by an airplane.

An automatic electronic inspection machine makes a four-way check of automobile valves at the rate of 3,000 per hour with a tolerance of five millionths of an inch.

An adhesive has been developed that will retain a metal-to-metal bond at temperatures as low as −253 degrees C.

All cords and cables give better service when handled properly. TIREX® portable cords and cables, *although jacketed with fortified and tempered neoprene armor and "lead cured" for toughness and smoothness,* will give still longer service if not subjected to unreasonable abuse.

By making jet nozzles radioactive and measuring the radiation from the fuel passing through them, the amount of wear can be measured to within one millionth of a gram per hour.

Further information on these news items and on Simplex cable is available from any Simplex office. Please be specific in your requests.

A miniature battery which is reported to last for five years, uses the radioisotope Prometheum 147. It is suitable for hearing aids, watches or missile guidance systems.

In California, it is proposed to use underground steam to generate electricity as is being done in Italy and New Zealand. Wells are now being drilled and a yield of 100,000 kilowatts is anticipated.

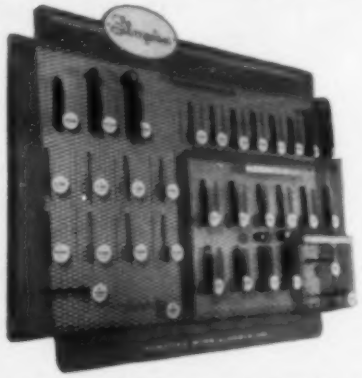
Two radio manufacturers have built extra service into their sets. One warns of approaching tornadoes and the other acts as a radiation detector.

Deuterium, or heavy hydrogen, is concentrated by some bacteria from sea water. This discovery may lead to a new and inexpensive method of producing the heavy water used in reactors.

The area behind the eye that can not be examined by other instruments can now be seen by a device that uses penetrating sound waves and converts their reflection into light.

A disposable medicine container of heat-proof plastic doubles as a hypodermic syringe.

Our atmosphere at an altitude of sixty miles is now known to contain chemicals which could serve as an unlimited fuel supply for ramjet engines.



What's in a name?

The character and business integrity of distributors are measured to a great extent by the products they handle. More than 1000 of the nation's most successful electrical firms — offering the utmost in customer service and satisfaction — recommend and sell Simplex TIREX cords and cables.

SIMPLEX WIRE & CABLE CO.
Cambridge, Massachusetts and
Newington, New Hampshire

Simplex

Highest quality cables for: Mining
Power & Lighting • Construction
Transportation • Communications
Signalling

"The American manufacturers of transoceanic telephone cables"

The Coal Commentator

Coal's Weapons

One very salutary exercise for a manager or owner of an organization, coal or otherwise, is to stop and consider (a) its present position and (b) its position at some future dates and the reasons therefore.

Though coal's position is definitely better than it has been for many years it still is far from free of threats. And by the same token it still has real potentials for meeting and overcoming those threats, which include nuclear power, more and more being discounted as an immediate hazard, and the possibility of changes in processes and techniques, such as, direct reduction of iron ore, which possibly could sharply curtail coal requirements at some future date.

The preceding are, however, only possibilities. Much more trouble in the years immediately ahead could be had from coal's old foes—oil and gas. Heavy fuel oil, for example, is being reduced along the East Coast, and Canadian gas pressure along the West Coast and northern border may soon increase.

Coal's weapons? The ever-potent ones of higher productivity and quality, reflecting continued investment in equipment and trained technical and management manpower. They will continue to serve coal in good stead on into the indefinite future.

Rear-Dump Lead

Coal stripping's penchant for coming up with the biggest now is being challenged in at least one field —haulage. So far, it appears that coal still holds the lead in semitrailer equipment with 80 tons or more —and 100 tons probable in the relatively near future as a result of bigger engines, better transmissions, and light alloys and aluminum. Applications of the latter include 60-ton bodies for semitrailers destined for Squaw Creek in southern Indiana. Coal stripping also was with the leaders in end-dump equipment but now the palm, for the time being, at least, goes to construction—and specifically to Western Contracting Corp. with an 80-cu yd rig on its Oake dam job in So. Dakota.

Maybe coal will have a job catching up in the rear-dump department, but there is little likelihood of its being challenged in semitrailers—or in shovels, draglines and drills.

New Insulation

Operation of electric motors in damp, dusty or corrosive atmospheres has long required, among other things, expensive enclosures, ventilating facilities and other specialties to insure freedom from breakdowns and minimum maintenance. **Now, new insulations and insulating methods offer major relief.**

These new insulations permit building motors that require no enclosures or special facilities (*Coal Age*, August, 1958, p 150, for example) and can even operate freely under water. Resistance to heat-aging, oils, chemicals and other contaminants are features.

Benefits, in addition to breakdown elimination and lower maintenance, include considerable savings in initial motor investment. All of these are of especial interest to coal.

Major Asset

A basic ingredient in progress is confidence—in coal as in all other forms of endeavor. Two examples of such confidence in coal recently to hand prompt this comment.

Glen Alden, in the harried and buffeted anthracite industry, provides the first example with its statement that the $2 million colliery modernization program recently completed reflects the organization's faith in the future of anthracite.

Joy, one of coal's partners on the manufacturing side, provides the second example with its recent committment to a "stepped-up research and development program for its coal machinery division" based on confidence that coal will grow importantly to meet both expanding steam and metallurgical demands.

This confidence, multiplied by the hundreds and thousands of others holding similar views, is one of coal's major assets.

Seeing Power

"Have we been seeing with a film in front of our eyes?" This is the question General Electric asked in transmitting to editors a copy of the September, 1958, special issue of *Light*, published by Large Lamp Dept. The year 1958, incidentally, is the 20th anniversary of the fluorescent lamp—at first only 40 W because of heat limitations but now offered in ratings up to 1,000 W.

On the question of seeing power, *Light* notes that the Illuminating Engineering Society now recommends double the light levels formerly considered appropriate.

Since there is a direct correlation between lighting levels and safety, quality and productivity, a new look at lighting practice in mining becomes even more important.

Completing the Record—Ensign Electric & Mfg. Co. notes that the listing of major electric equipment in the Commentator item dealing with Ayrshire's new AC mine (September, 1958, p 11) was incomplete. All the underground electrical control for the belts, the distribution boxes and the low-voltage transformer plugs are being furnished by Ensign—through Jeffrey, which is supplying the belts.

More tonnage . . . more profits

50% Higher Tonnage with the *new* CM37

For medium and high seams

Backed by the tried and proven cutting principle of the original Lee-Norse Miners, the CM37 brings a new high in operational efficiency to continuous mining. This rugged machine has more power, more capacity and higher tramming speed that results in increased tonnage per man shift.

Check these NEW FEATURES!

1. Total weight 25 tons—a 25% increase! Extra weight mostly in improved cutter head where it does the most good!
2. More power—fewer motors! Only 3 identical electric motors used . . . conservative continuous ratings . . . no water cooling.
3. Heavy duty electric control.
4. 14" wide crawler treads with improved hydraulic motor and gearing.
5. 24" wide conveyor driven by hydraulic gear motors applied directly to gathering head. Hydraulic start and stop . . . no clutch required.
6. Multiple tramming speeds—variable speeds to 50 feet per minute . . . fast tramming at 90-100 feet per minute.
7. Increased capacity...4 to 5 TONS PER MINUTE.

Coal high or low? . . .

. . . with Lee-Norse MINERS

For Low Coal . . .

LCM28

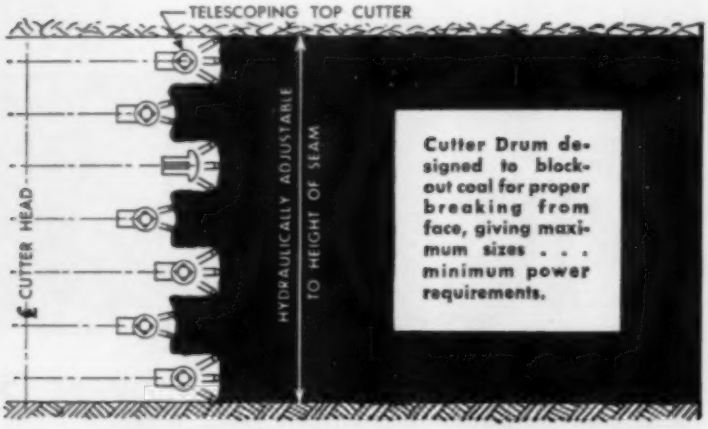
ready for production!

For seams 30" to 48"

Here's how LCM28 *produces profitable tonnage!*

1. Weight 16 tons — rugged and heavy enough to cope with tough cutting conditions.
2. Capacity—2 to 3 tons per minute.
3. Hydraulically driven 24" flexible Conveyor.
4. Two Cutter Heads cut a wide face 16 feet or less.
5. Dual gathering arms have maximum reach of 11 feet . . . will gather ALL the coal regardless of position.
6. Controlled Tramming Speed gives proper sumping action and Dual Pump combination gives high tramming speed.
7. Especially good in cross-cut development!

The LCM28 "Low Coal" Miner employs a new combination of cutting and gathering coal. The vertical mounted extendable cutter drums arc together like a "clam shell."


TELESCOPING TOP CUTTER
CUTTER HEAD
HYDRAULICALLY ADJUSTABLE TO HEIGHT OF SEAM
Cutter Drum designed to block-out coal for proper breaking from face, giving maximum sizes . . . minimum power requirements.

All Lee-Norse Miners are available in AC or DC power.

Lee-Norse Company
CHARLEROI, PENNA.
Specialists in Coal Mining Equipment

Lee-Norse MINERS keep production on the go!

Now is the time to DODGE

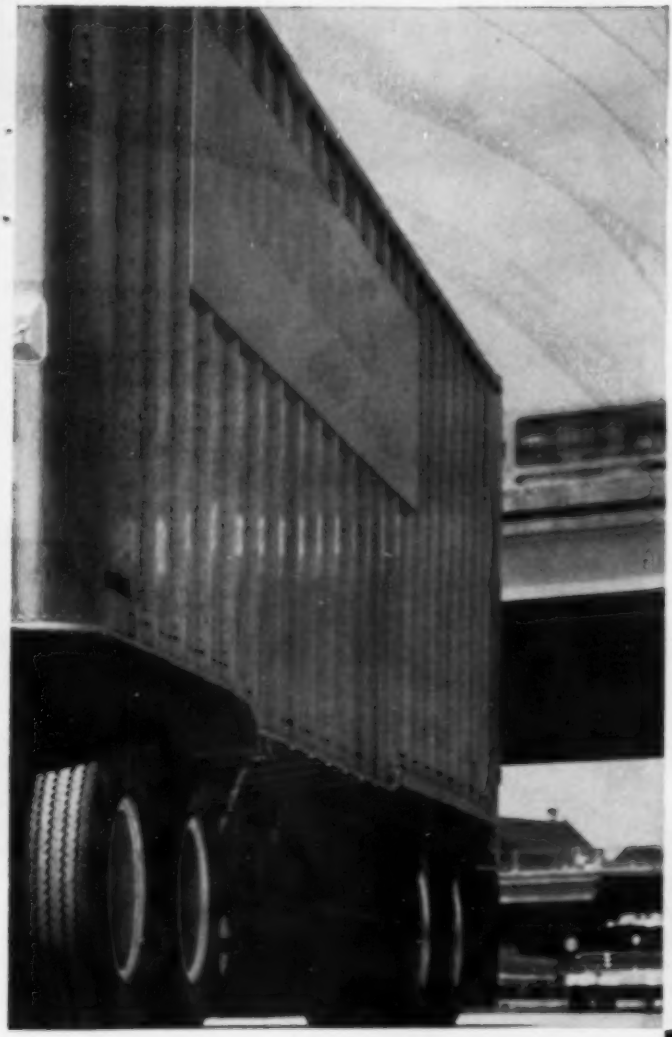
New '59 Dodge Power Giants, "Job-Rated" for

CONVENTIONAL Models 400, 500, 600, 700, 800, 900—G.V.W.'s to 30,000 lbs.; G.C.W.'s to 65,000 lbs.

TANDEM Models T700, T800, T900—G.V.W.'s to 49,000 lbs.; G.C.W.'s to 65,000 lbs.

C.O.E. Models C500, C600, C700—G.V.W.'s to 25,000 lbs.; G.C.W.'s to 50,000 lbs.

drive the new 1959 Power Giant



CHANGES . . . WHERE THEY COUNT!

New performance!

New comfort!

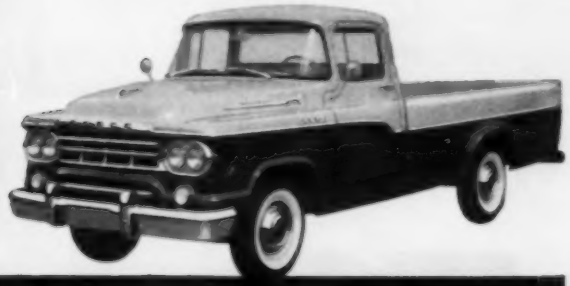
Look into the cab—look into the chassis! Wherever you look in the new 1959 Dodge trucks, you'll find changes that *mean something*. New convenience, for instance, in suspended brake and clutch pedals, and hydraulically operated clutch. New heavy-duty electrical system. Greater dependability. Increased G.V.W.'s on tandems. Concealed running boards on medium-tonnage models.

You'll find new cab comfort, too, and better heaters. Plus new instrument panels designed especially for medium- and high-tonnage requirements.

Ask your dealer about all the new Power Giant advancements. And about the new network of Dodge Truck Centers that let him give quick delivery of any Dodge truck to meet your exact needs. Plus hurry-up parts service. See him soon!

★ ★ ★

Striking new Dodge low-tonnage models! This spirited new Sweptline Pick-up leads a complete line of new 1959 Dodge low-tonnage trucks. Advanced models for every need, from 5,100 to 10,000 lbs. maximum G.V.W.

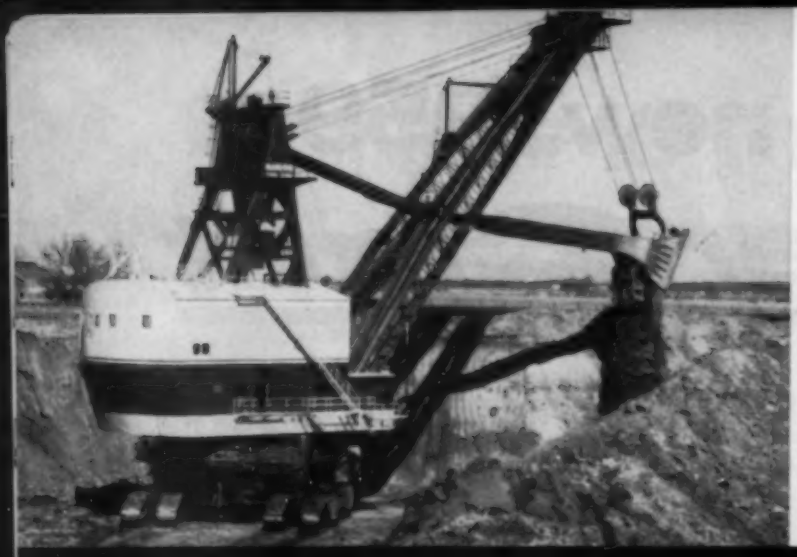


every trucking need

4-WHEEL-DRIVE Models W100, W200, W300, W300M, W500—G.V.W.'s to 20,000 lbs.

FORWARD-CONTROL Models P300 and P400 G.V.W.'s to 15,000 lbs.

TODAY . . . IT'S REAL SMART TO CHOOSE DODGE POWER GIANTS



Midland Collieries Inc. Shovel Location – Victoria, Ill.

Peabody Coal Co. Shovel Location – Freeburg, Ill.

Hanna Coal Co. Shovel Location – Cadiz, Ohio

Simco-Peabody Coal Co. Shovel Location – Coshocton, Ohio

WORLD'S LARGEST—The MARION 5760

MARION

POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

A Division of Universal Marion Corp.

Marion manufacturers a complete line of excavators from ¾ to 75 cubic yards

These Marion 5760s are machines of tremendous proportions and amazing production capacities. With dipper sizes from 60 to 70 yards and boom lengths up to 150 feet, they strip up to 120 feet of overburden and deposit it almost a block away. These giant machines are piling up impressive performance records, month after month, in coal fields. Two of the four have already moved over 2,000,000 cubic yards in a single month.

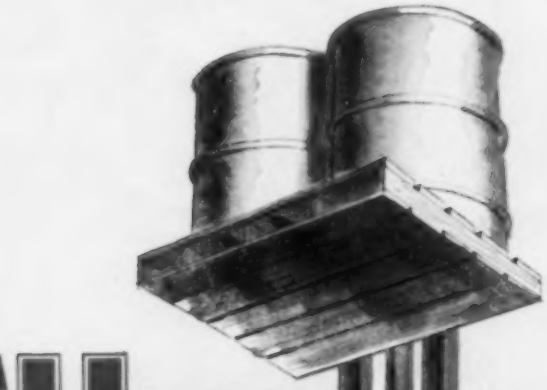
Consult Marion Mining Specialists for Lowest Costs on Your Property

"Timely and informative"

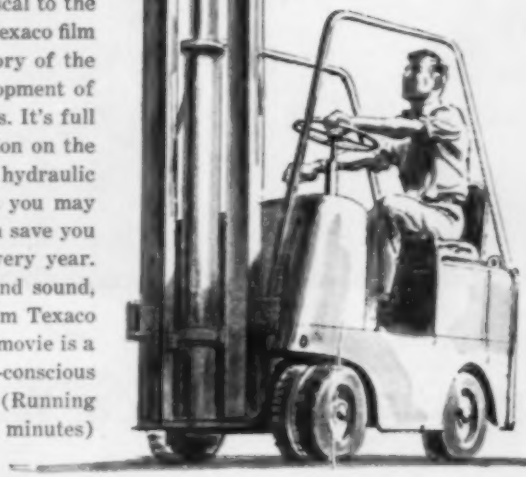
SEE!

TEXACO'S new industrial service movie about...

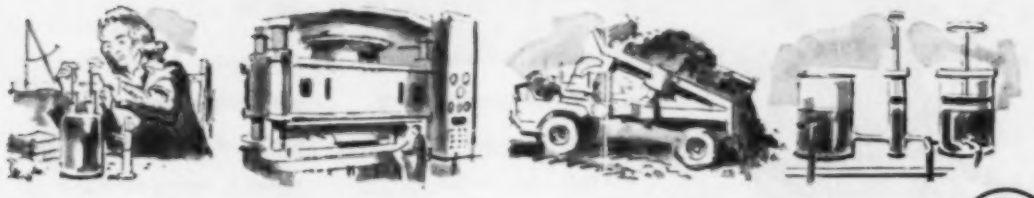
"HYDRAULICS"



From Pascal to the present, this new Texaco film tells the story of the discovery and development of hydraulic principles. It's full of valuable information on the care of your hydraulic equipment – facts you may not know that can save you thousands of dollars every year. Filmed in color and sound, this new 16mm Texaco industrial service movie is a "must" for every cost-conscious plant engineer. (Running time: 25 minutes)



For information regarding FREE SHOWING to your plant or organization, write Hydraulic Film, Room 2006, The Texas Company, 135 E. 42nd St., New York 17, N. Y.



TEXACO

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

USS Tiger Brand Electrical Wire & Cable

A standard cable for every special job

- Asbestos Wire and Cable
- Mold Cured Portable Cord
- Shovel & Dredge Cable
- Paper & Lead Cable
- Varnished Cambric Cable
- Interlocked Armor Cable
- Special Purpose Wire & Cable
- Aerial, Underground and Submarine Cable

Even under the toughest working conditions—

Amerclad

puts power where you want it!

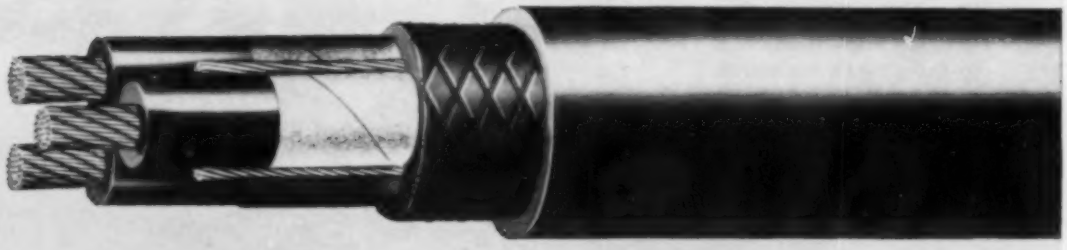
Of all the machines and equipment on your job, none is subjected to more gruelling treatment than portable power cable. And none demands less attention. You reel it out, connect it up . . . and forget it. *That is, if what you are using is Tiger Brand Amerclad.*

For Tiger Brand Amerclad Portable Power Cord and Cable is made *extra* strong and *extra* tough to withstand the worst that man and the elements can dish out. Constant exposure to sun, rain and snow have little or no effect on it; you can drag it over and around sharp rocks, through mud and wet concrete; even run over it with heavy trucks—all without damaging its tough hide.

Tiger Brand Amerclad Cord and Cable consists of flexible, rubber-insulated conductors encased in a tough, resilient protective jacket of Amerprene, an oil-resistant compound of extreme density and toughness that is both moisture-proof and fire-resistant.

For more information, get in touch with your American Steel and Wire salesman. Or write direct to American Steel & Wire, 614 Superior Ave., N. W., Cleveland 13, Ohio.

USS, Tiger Brand, Amerclad and Amerprene are registered trademarks



American Steel & Wire Division of USS **United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

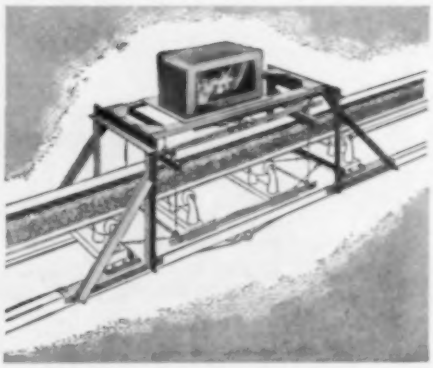
New Concentrating Plant near Hibbing, Minnesota

8 ABC®s Scales mean increased concentrate production

ABCs Belt Conveyor Scales have substantially increased concentrate production at this new washing, heavy media, spiral and cyclone plant. Efficiency demands accurate continuous weighing of:

1. incoming crude ore
2. heavy media feed
3. heavy media concentrate
4. cyclone feed
5. spiral concentrate
6. washed fine concentrate
7. total fines concentrate
8. washed ore and coarse concentrate

For more information on how ABCs Scales can improve *your* production efficiency, contact your local representative or write for Bulletin 100A.

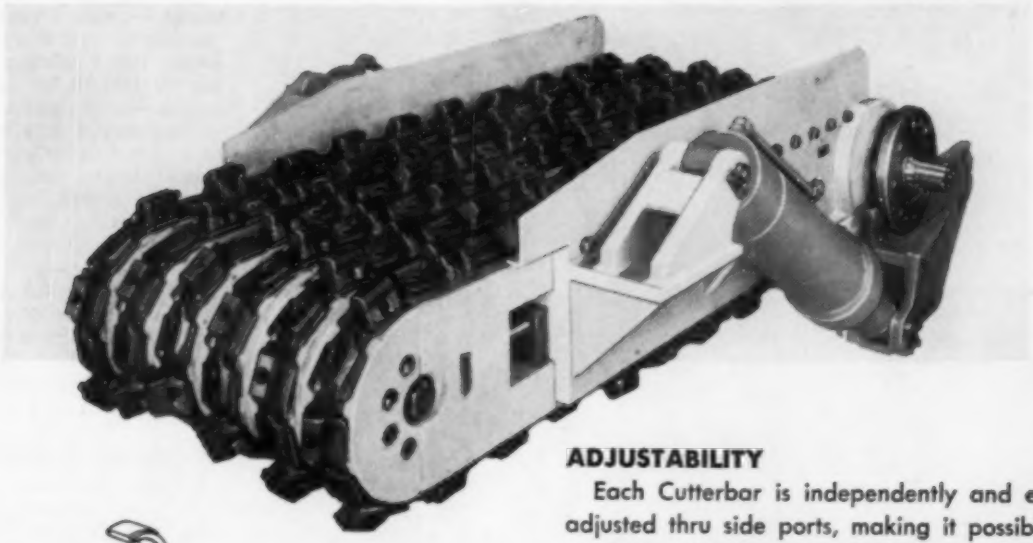


ABCs BELT SCALES AND FEEDERS

ABCs SCALE DIVISION • McDOWELL COMPANY, INC. • 16330 WATERLOO ROAD • CLEVELAND, OHIO

another continuous mining advance . . . newest

Bowdil MULTI-BAR RIPPER HEAD

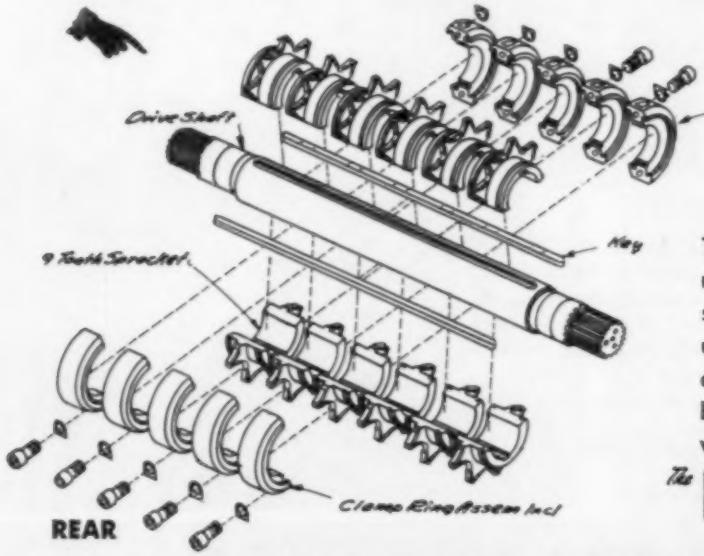


IMPROVED

special hard-surfaced Wearing Shoes used in heads of the Cutterbars eliminate maintenance on roller and bearings as formerly used.

REAR OF THE RIPPER HEAD FRAME

Sprockets are clamped to an oversize Shaft, locking Shaft and Sprockets into an integral unit equivalent in strength to a 9" diameter Shaft . . . completely eliminating deflection, the chief cause of bearing failure.



ADJUSTABILITY

Each Cutterbar is independently and easily adjusted thru side ports, making it possible to retain equal tension on all chains at all times.

INTERCHANGEABILITY

All chains are similar in kerf and lacing arrangement for interchangeability as desired. All sprockets are also interchangeable. Chains may be run with or without renewable liners in the Cutterbars to suit your conditions.

RIPPER HEAD ASSEMBLY

includes a special improved design Head Drive Shaft and Sprocket Assembly which makes it possible to renew a sprocket IN MINUTES without removing the Shaft . . . two-piece sprockets, held on the Double Keyed Shaft by special design Resilient Clamping Collars, maintain extreme tension to the Shaft.

► **DEPENDABILITY**

This design MULTI-BAR RIPPER HEAD is made from high grade alloy heat-treated steels. It has been, like all Bowdil products, thoroughly tested under severest conditions over a long period of time before announcement. This is in keeping with the standards of

The **BOWDIL COMPANY**
CANTON 1, OHIO

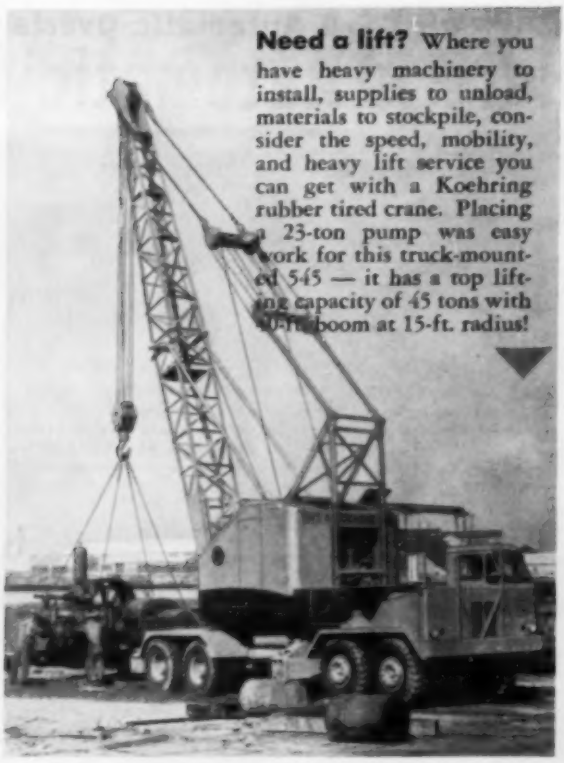
► *For illustrative information of this unit, write or call the factory: GLendale 6-7176*

High-lift 1205 — Here's a heavy-duty, high-lift shovel (at right) that really puts stripping on a long-reach basis! For instance — with *3-yard* dipper on 40-foot high-lift boom, this Koehring 1205 has 42 foot-10 in. cutting height—at 45° boom angle — and dumps at a height of 31 feet-5 in. *Want more reach?* It also can be used with a 2½-yard dipper on a *50-foot* high-lift boom! This gives you 51 foot-4 in. cutting height — 40 foot-10 in. dumping height at 45° boom angle. On clamshell or dragline work, it handles 3 to 4-yd. buckets on 60 to 170 feet of boom.

Stripping 35 to 45 ft. of overburden from a 120-acre area (below), Koehring 605 dragline uncovered a coal vein 5 to 7 ft. thick. Working 18 hours a day, it stripped clay, common earth and shale. Bucket sizes on this heavy-duty 605 dragline range from 1½ to 2½ yards. Boom lengths — 50 to 110 ft., depending on materials. Converts to 36-ton lift crane, 1½-yd. standard or high-lift shovel.

Feeding gravel from bank into hopper, Koehring® 805 clamshell crane easily met plant production requirements at this pit. Belt conveyor system carries gravel from pit to crusher. Operators like the 805's ease of control, main-drum power clutches giving accurate "feel" of load, and spring-loaded air-released traction brakes. *You'll* like its big work capacities: 2 to 3-yard clamshell or dragline, 52-ton crane, 2-yard shovel. See Koehring distributor today.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis. . .



Need a lift? Where you have heavy machinery to install, supplies to unload, materials to stockpile, consider the speed, mobility, and heavy lift service you can get with a Koehring rubber tired crane. Placing a 23-ton pump was easy work for this truck-mounted 545 — it has a top lifting capacity of 45 tons with 40-ft. boom at 15-ft. radius!

Koehring excavators and cranes also manufactured in:
• • • CANADA • ENGLAND • SPAIN • JAPAN

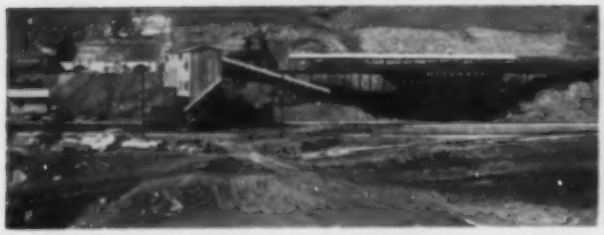
Quick facts on KOEHRING WORK CAPACITY:

MODEL	TYPE OF MOUNTING	CRANE LIFT CAPACITIES (Rubber-tired machines rated at 85% of tipping load.)	
ON RUBBER			
205	3-axle truck, or 21.5 mph Cruiser	30,000 lbs.	at 12-ft. radius
305	3-axle truck, or 18 mph Cruiser	50,000 lbs.	at 12-ft. radius
425	4-axle truck	70,000 lbs.	at 15-ft. radius
545	4-axle truck	90,000 lbs.	at 15-ft. radius
	Size shovel	CRANE LIFT CAPACITIES (Crawler ratings based on 75% of tipping load.)	
ON CRAWLERS			
205	½ Cu. Yd.	20,000 lbs.	at 10-ft. radius
305	¾ Cu. Yd.	30,000 lbs.	at 12-ft. radius
405	1 Cu. Yd.	40,000 lbs.	at 12-ft. radius
545	(Crane only—85% rating)	90,000 lbs.	at 12-ft. radius
605	1½ Cu. Yds.	72,300 lbs.	at 12-ft. radius
805	2 Cu. Yds.	104,300 lbs.	at 12-ft. radius
1205	3 Cu. Yds.	190,000 lbs.	at 12-ft. radius

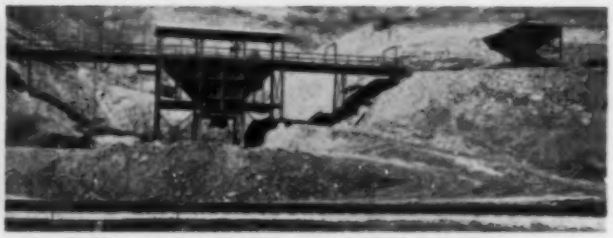
Extra lift capacity means . . . ***MORE WORK CAPACITY WITH ALL ATTACHMENTS***

NOW - with S-D Automatic Overlapping End Cars...

Here is Automatic Loading and Dumping

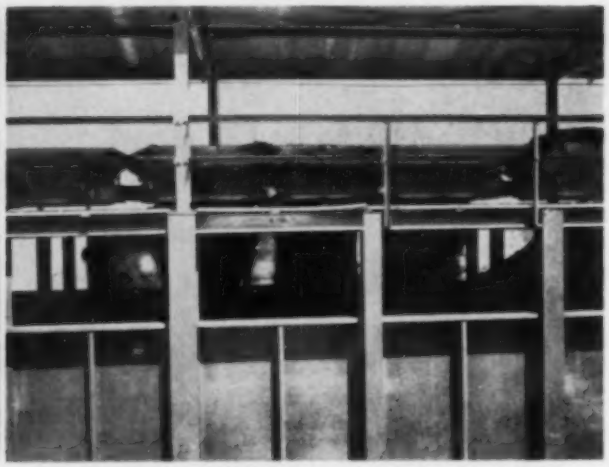


SOUTH-EAST COAL COMPANY'S Camp Branch, Ky., mine is an impressive example of alert, hustling management and operating personnel. Only a few machines and men are required for this simple, organized operation. Above you see the tipple and coal storage bin. Conveyor runs continuously hauling coal from bin to tipple. Bin provides surge capacity to permit successive dumping of long trips.



SLATE BIN is located a few hundred feet from Coal Storage Bin. The small bin in picture above provides track ballast. The same S-D Automatics that haul coal also haul out the top and bottom rock to Slate Bin. S-D "Automatic" Overlapping End Cars more than meet South-East's planned program for haulage at absolute minimum cost! Not only can a single trip of S-D Overlapping End Cars be loaded continuously and dumped one-after-another without stopping, but they provide maximum haulage safety! Automatic couplers eliminated accidents. Fingers, hands, arms, no longer have reason to be between cars, nor can a man get between cars after coupling!

Here you see trip of S-D Automatic Overlapping End Cars as it enters bin. Conveyor under track hauls coal from bin to tipple.

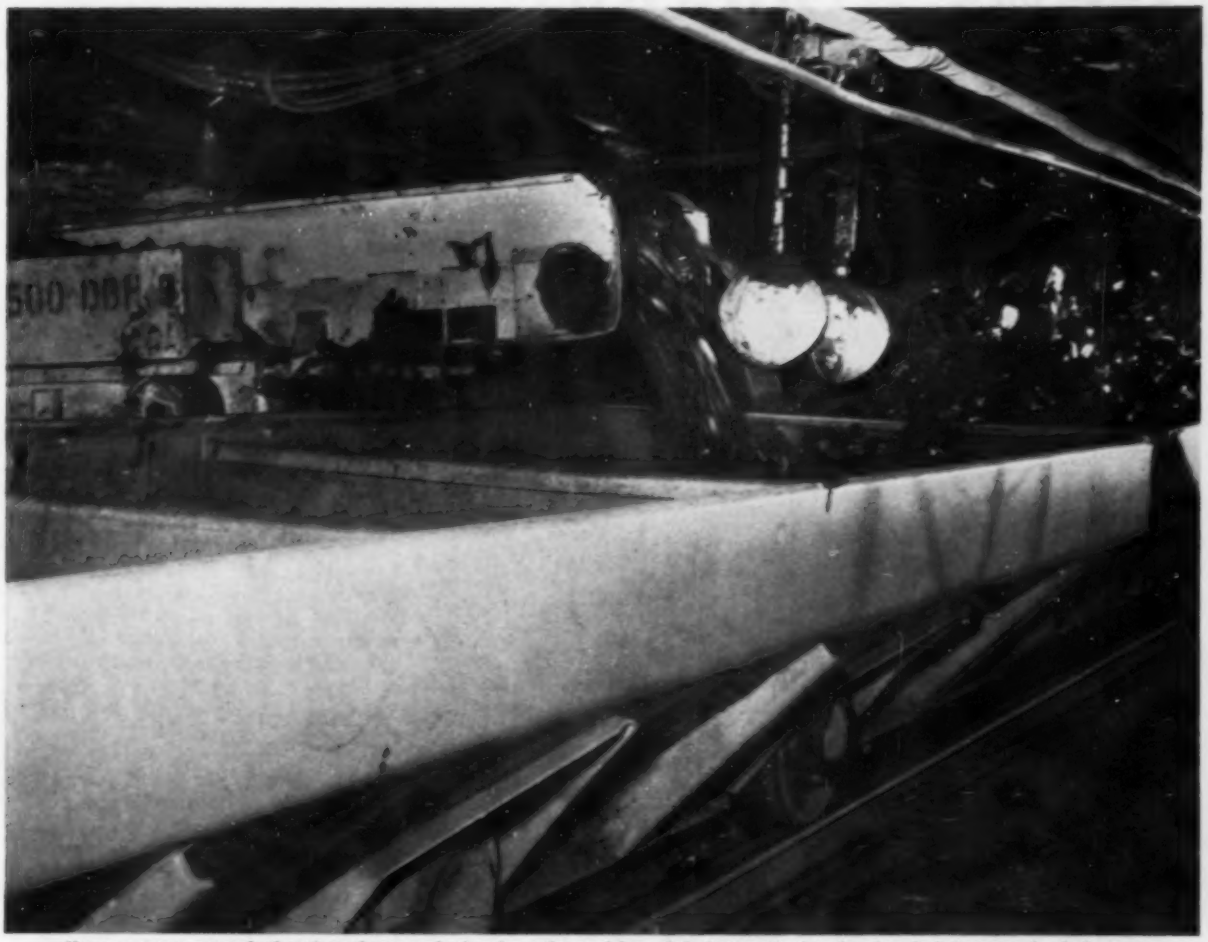


Close-up above of S-D Automatic Bottom Dumping Cars was made while trip was dumping. You can see bottom dumping doors actually down and the coal discharging.

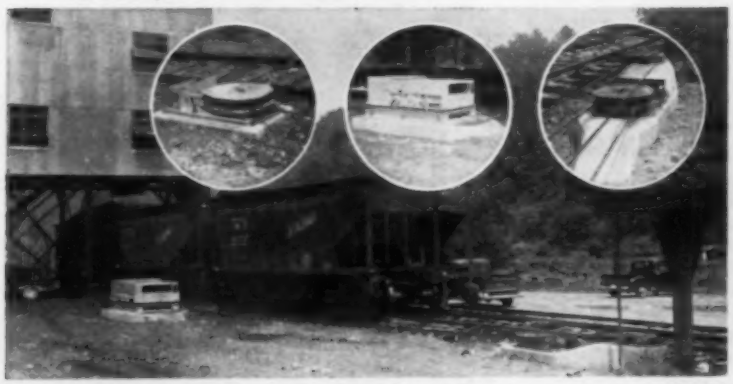
TWENTY-NINE MEN, including Mr. Chester Cureton, day-shift foreman, pictured above, and Mr. T. B. Smith, night-shift foreman, operate one continuous miner two shifts at this mine. At present, operations consist of driving and grading a main line heading a distance of some 27,000 feet. In early 1960, additional sections will bring this mine to its designed capacity of 3,000 tons per day with no change in the basic haulage system.

This S-D Automatic Haulage System operates with minimum manpower requirements. The motor crew not only handles all haulage, but checks the performance of the manless automatic loading station. Clinton Fleming, above, is day-shift motorman. Earl Adams is motorman on night shift. These men are in charge of the system and make it tick like clockwork, leaving a trip of 10 to 16 empties to be loaded and hauling out a pre-loaded trip of 10 to 15 cars.

...and Maximum Haulage Safety!



Here you see untouched action photograph showing why and how S-D Automatic Overlapping End Cars are loaded continuously one-after-another at South-East. Note coal coming off conveyor. See how portion of coal is finishing-up loading forward car while the other portion is starting to load empty car. (Trip was caught in movement while overlapping ends were directly under conveyor). Switches operated by ball movement activate hydraulic spotter which moves trip.



S-D "BROWNIE" Double-Rope Hoist moves railroad cars under loading chute at tipple.

SANFORD-DAY

KNOXVILLE, TENNESSEE

- S-D Mine Cars, all types and kinds.
- Precision S-D Mine Wheels.
- Tough, year-after-year wheel service by special S-D wheel Hard-Facing Process (this can really save you money and eliminate downtime).
- S-D "Brownie" Hoists. • S-D Car Spotters, all types, including special drop bottom car spotters.
- S-D Mine Sheaves and Rollers.
- S-D Automatic Loading Stations for Mine Car and Railroad Car Loading points.
- S-D Slusher-Trains for mining and construction industries.
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This is an Actual Operation Picture-Report on the performance of S-D Automatic Overlapping End Cars. Savings provided by these cars are tremendous! One large mine recently converted its big Rotary Dump operation into a similar open track bin to realize the automatic-loading and automatic-dumping savings obtained only by S-D Automatic Overlapping End Cars. Every S-D Automatic Overlapping End Car installation is earning major savings! We have movies showing these cars, large and small, in regular mine haulage. May we show them to you? Write us today.

SANFORD-DAY IRON WORKS, INC., KNOXVILLE, TENN.

COAL AGE

News Roundup

PUSH-BUTTON UNLOADING facilities eliminate need for costly onshore installations. Ship can discharge coal at rate of one ton per second.

New Collier Eases Delivery

Last month's launching of the first self-discharging super collier, the S.S. Consolidation Coal, is a big step toward easing the problems posed by ocean delivery of large volumes of coal to wharves and plants.

Holding the promise of substantial reductions in coal transportation costs, the new collier is the first of three planned for operation by the Pocahontas Steamship Co.

With a coal-carrying capacity of 24,000 tons (double that of conventional colliers), the new ship has completely automated unloading facilities and needs no dockside installations except for a simple storage facility.

The ship's discharge rate is 3,600 tons of coal per hour.

Conventional colliers, with their discharge rate of about 300 tph, require expensive onshore facilities, such as bridges, stackers and towers.

The S.S. Consolidation has a 250-ft boom conveyor to discharge the coal at any location within range of the boom's 89-deg arc on either side of the ship.

For shallow waterways that prohibit the ship from reaching the dock, her boom enables her to unload into a series of barges to ferry the coal to shore. The boom is equipped with a detergent spray at the tip to assure dustfree discharge.

In unloading, coal funnels by gravity through 159 hoppers at the bottom of the seven holds in the ship. The hoppers have hydraulically operated gates which open to allow coal to feed onto three horizontal conveyor belts that run under all of the holds.

Coal from the conveyor belts is fed into the buckets of two 84-ft elevators. These inclined elevators carry the coal up to deck level where it is transferred to the boom and then onto shore.

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NCA Seeks Change In Oil Imports

The National Coal Association has petitioned the government to include regulations in the new proposed oil imports plan to limit imports of residual oil and restrict crude oil imports to the 1954 level.

The NCA lists its reasons for opposing the new plan as being:

1) "It makes no provision for controlling imports of petroleum derivatives, except insofar as unfinished gasoline and unfinished oil are incorporated in the basic allocation for crude oil imports.

2) "It does not include residual oil. It should do so.

3) "Relating imports of crude oil and unfinished gasoline and oil to domestic refinery capacity would result in no substantial reduction in the total volume of imports.

4) "It provides no effective means of enforcement.

5) "It would leave the importing oil companies free to establish their import programs within generous limits provided by the new regulations.

6) "Neither the proposed regulations nor the general marketing policy of the oil-importing companies recognize the general reduction in industrial energy requirements in recent months. The oil importers are permitted to continue shipments at the high level of 1957, flooding foreign oil into a nation with substantially reduced markets and overstocks of domestic petroleum supplies."

An announcement is expected "before long" as to just what the final oil imports program will be. During the 30 days allowed for submitting suggested revisions, oil and coal men both voiced dislike of the proposed plan.

Regardless of any revisions, however, most observers feel the new plan still will be based on refinery runs.

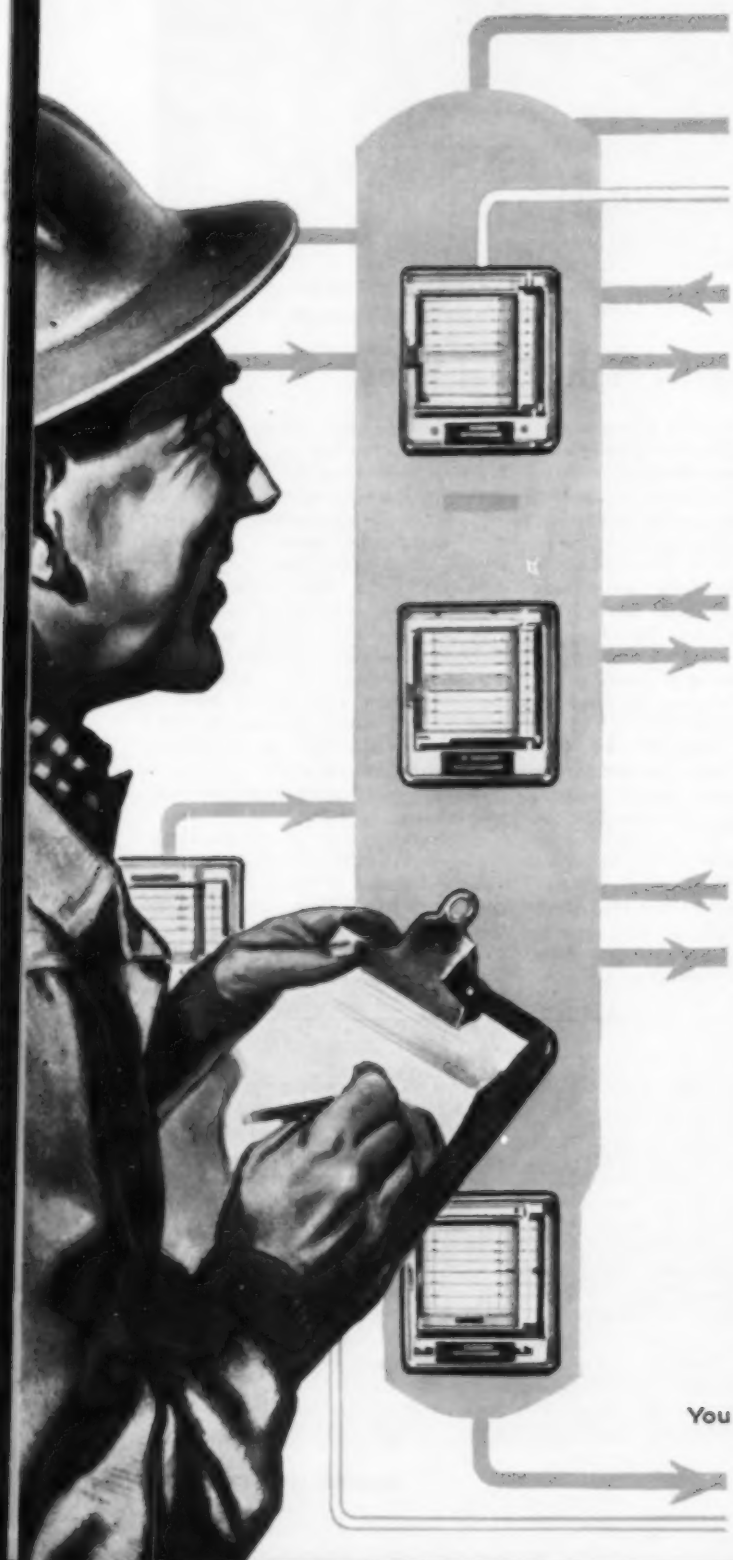
Coal Fund Merger Chances Are Slim

Chances are slim for the merger of the anthracite and bituminous Health and Welfare Funds.

Forty regional anthracite representatives of the United Mine Workers union returned from their Washington meeting

Nothing gets by

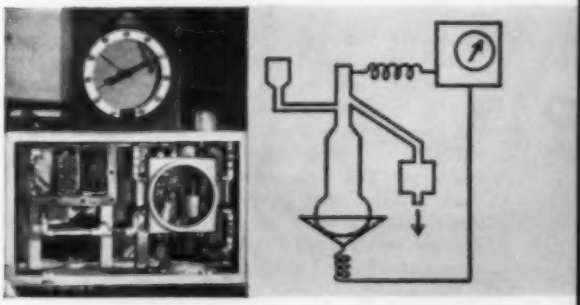
Automatic end-point testing device developed by Standard Oil research men makes certain of the uniform quality of gasoline and diesel fuel delivered to you.



Scientists at Standard Oil never stop in their drive to improve and then improve again the uniform quality of the petroleum products that bear the Standard Oil trade-mark. These engineering research scientists have now created wholly new instruments for performing near continuous physical analysis *automatically.*

One such instrument automatically performs the physical analysis that determines end-point. Using it, refineries maintain a continuous inspection of the temperature at which gasoline and diesel fuels are completely distilled. To you, this means that Standard is able to maintain a constant control over the uniformity and high quality of the gasoline and diesel fuels you use. It also means that Standard Oil power-producing petroleum products, with their constantly controlled end-point, burn uniformly, give you uniform high performance.

This is part of the research pay-out, the "something more" research builds into the products you buy from Standard. This is your return from Standard's investment in research. And now there are 48 district offices in the 15 Midwest and Rocky Mountain states to serve you. Call the one nearest you. **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**



Automatic end-point tester works this way. A small sample is placed in an electrically heated flask. The temperature is measured and recorded during a heating cycle when distillation is accomplished. Distillate is condensed and drained, the flask temperature is lowered by introduction of the next sample, and the apparatus is ready for another test.

You expect more from STANDARD and get it!

with UMW president John L. Lewis last month convinced that a dwindling anthracite industry has closed the door to the merger of the two funds.

Pointing out that they received a cordial reception, delegation members said UMW leaders said they were aware of the situation but stressed the fact that "nothing can be accomplished overnight."

UMW officials refused to comment on the meeting except to confirm it as a "family affair."

The two funds are kept separate because the hard and soft coal miners work under separate contracts with mine operators. Royalties per ton of coal mined are used to finance the two funds. Anthracite mine owners pay 50c per ton and bituminous owners pay 40c.

The bituminous fund has been paying the full $100 monthly to retired soft coal miners as well as financing hospital services and other benefits never taken on by the anthracite fund.

In recent years, the anthracite industry has dwindled so as to cut sharply into the fund balance. As a result, pensions to retired hard-coal miners have fallen from $100 monthly to as low as $30 monthly this past summer.

Canadian Gas Poses Threat to U.S. Coal

The Canadian Government's "Royal Commission on Energy", commonly called The Borden Commission, has recommended as a matter of basic policy that the Dominion continue to license exports of natural gas and crude oil to the United States.

The commission, a six-man body chaired by Henry Borden, lawyer president of Brazilian Traction, Light, Heat, and Power Ltd., was set up a year ago, just after the Conservative party came into power. The Conservatives had been highly critical of the Liberal governments financial assistance to the construction of Canada's first west-east gas pipeline by Trans-Canada Pipeline Ltd.

The new government had to decide what to do about a scheme which nearly was completed and which it opposed.

It gets no specific answer from the commission, except that a recommendation that an export permit to Trans-Canada covering the sale of 200,000 MCF of natural gas be withdrawn. The permit was conditional on Tennessee securing an import permit from the Federal Power Commission to take the gas at Emerson, Man., and distribute it in the Chicago area.

The commission finds Trans-Canada has now sold all the gas it is authorized to move out of the province of Alberta to users in Eastern Canada.

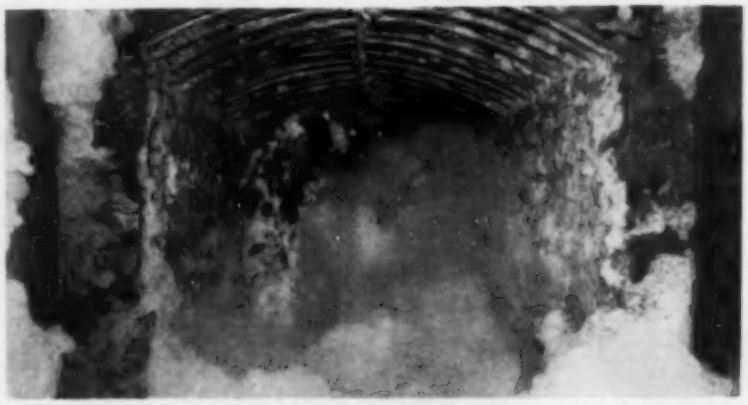
It proposes that if Trans-Canada gets a further allocation of gas from Alberta a new application for an export permit be dealt with on its own merits.

Broadly, the commission finds Canada's proven reserves of gas and crude oil are far in excess of Canadian requirements and thus exports to the United States are desirable.

The commission calls for the appointment of a "National Energy Board" to advise the government on policy in relation to all energy matters under federal jurisdiction and specifically to issue certificates of public convenience to applicants for the construction of pipelines which cross between provinces or the international border, and to license both export and import of gas and oil. Gas export licenses should run for 25 yr.; licenses covering export and import and export of crude oil and products should be for 1 yr.

Strict regulation of the pricing and other practices of companies moving gas and oil in interprovincial or international trade is recommended. That function,

(*Continued on p. 50*)



TESTS SHOW that foam can be used to extinguish and control coal fires. A few minutes before this picture was taken, the mine was a raging fire.

Bubble Baths Fight Coal Fires

Femininity has invaded American coal mines. Bubble baths are now being used to fight fires—successfully too.

Bubble-making solutions, containing the same chemicals used in detergents, are used. Mixed with water and sprayed on a cotton screen or net stretched across a mine passage, the solution forms large bubbles that quickly build into a huge mass or "plug" of foam. The plugs are carried by the mine ventilating current to the fire zone, where the water in the foam vaporizes, lowering the temperature and subduing the flame.

Originated in England, the U.S. Bureau of Mines feels the method has promise for American mining practice, especially as a means of controlling the fire long enough for men to move in close and extinguish it with water or other conventional means.

The Bureau says the test worked on six out of nine tries in their experimental mine near Bruceton, Pa. Four different brands of foaming agents, some with stabilizing agents and some without, were used in the tests.

The conclusion reached by the Bureau is that coal fires of moderate size and intensity can be controlled effectively even though the foam is generated several hundred feet away.

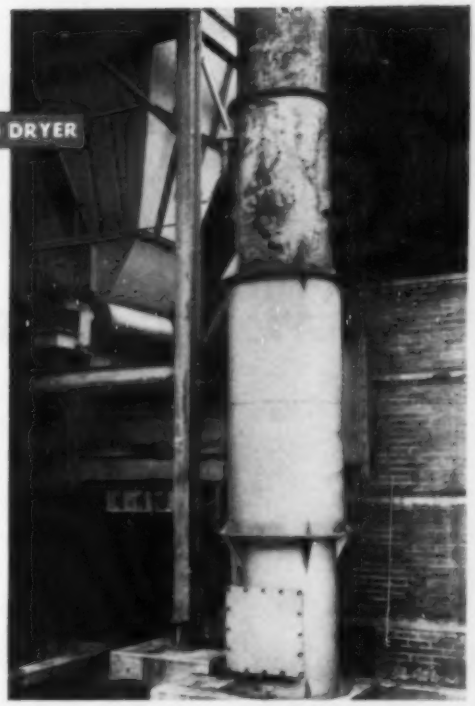
Several factors, such as the distance the foam plug must travel to the fire zone and its moisture content on arriving there, determine the method's effectiveness. For example, bureau workers were able to generate a foam plug 1,600 ft long, but its front contained so little moisture it would have been virtually useless in quenching a fire.

One of the effective plugs, however, traveled over 1,000-ft.

A complete report of the year-long testing, including laboratory foam generating test results of some 35 foaming agents and 20 additives, in addition to the nine mine tests, can be obtained from the Bureau of Mines, Publications Distribution Sec., Pittsburgh.

LET'S BE SPECIFIC...

about facts why H & P Fine Coal Cleaning Circuits are operating so successfully.



We design and build coal preparation plants with tried and tested H & P approved equipment, specifically . . . H & P Fluid Bed Dryer, H & P Sieve Bend, H & P Cyclones and Reineveld Fine Coal Dryer

...in other words, the best equipment of it's kind!

But above all, the H & P designed Coal Preparation Plant is the product of a team of enthusiastic, yet precisely analytical engineers who blend experience with ingenuity. They, in turn, are backed by modern production facilities and methods. To sum it up, you will find teamwork and know-how when you deal with Heyl & Patterson.

For complete information, request the visit of an H & P Contracting Engineer or write for these brochures:

557—Coal Preparation Plants
1157—H & P Cyclones
558—H & P Sieve Bend
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Vice President, Engineering

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LEE BARRETT
Director, Research and Development

"We are working hard developing new types of coal machinery. We want to make certain that our research is geared to your future needs."

HELP YOU SOLVE MINING PROBLEMS with operation underground

GEORGE FOX
Manager, Franklin Plant

"We want to learn more about your operating conditions . . . your machinery and service requirements . . . to have your needs clearly in mind when we set up our manufacturing programs."

The men pictured here are part of a team of Joy management now visiting coal mines all over the country. These men, and the men who design and produce Joy machines, are going underground to talk to operators, foremen, superintendents—to learn your problems first hand.

The manufacturing men want to learn how to make our machines better. The engineering and research people want to get your best thinking on new machines, new methods, new operations.

On these visits, the Joy team wants to listen and to learn so that they can return to their jobs with a better understanding of practical problems. This understanding will guide our quality control, our production, our research and development, our service and deliveries.

If you have a particular problem where this group might be of assistance, please drop me a line today.

John D. Russell
Vice President, Engineering

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People in Coal

Henry F. Warden

New Association President

HENRY F. WARDEN is president of the newly-formed Smokeless Operators Assn., which covers District 7 operators.

Spending all of his working life in the coal industry, Mr. Warden has spread his energy and talent over both organizational and business activity in the production of coal.

He was born May 29, 1893 at Monroe, N.H. Graduating from Pratt Institute, Brooklyn, with a degree in industrial and chemical engineering, he began his coal career as a chemist and coal inspector with the Pocahontas Coke Co. in Bluefield, W. Va. in 1913. A few years later he joined Wm. C. Atwater & Co. Rising through various positions, he became general superintendent of the affiliated company mines in 1926. He remained in this position until 1935 when he advanced to general manager and vice-president of the American Coal Co. and the Mill Creek Coal & Coke Co.

His next big step was to the presidency of these operating companies and Wm. C. Atwater & Co. in 1948. The Atwater Co. and its subsidiary operating mines were sold to Pocahontas Fuel Co. in 1955. Since that time Mr. Warden has been a vice-president of the fuel company. Since 1954 he has been president of the Pocahontas Operators Assn.

In addition, he is a member of the board and chairman of the executive committee of Southern Coal Producers Association; a member of the board and steering committee of the West Virginia Coal Association; a member of the Land and Water Use committees of the National Coal Association and the American Mining Congress, and a board member of the Coal Producers Committee for Smoke Abatement.

C. F. Clement has retired as president but will retain his position as chairman of the board of Rich Hill Coal Mining Corp. **C. F. Clement, Jr.** has been elected president. **Ralph E. Moore** was elected vice-president and general manager, and **C. Lyle Knight** was elected secretary.

R. M. Johnson, manager, Rockhouse Div., of Island Creek Coal Co., has been promoted to the position of manager of mines with offices at Holden, W. Va.

Mr. Johnson started with the company in 1947 as a section inspector in the industrial engineering department. He has risen successively to his most recent position of division manager where his duties included operational direction of five of Island Creek's mines in West Virginia and Kentucky. Mr. Johnson holds a degree in mining engineering from Virginia Polytecnic Institute.

L. G. Barber, present assistant division manager, replaces Mr. Johnson as manager of the Rockhouse Division. Mr. Barber has been associated with the company since 1932. His office will be located at Ragland, W. Va.

George E. Owen, president of Imperial Coal Corp., was reelected to his second term as president of The Central Pennsylvania Coal Producers' Association and Eastern Bituminous Coal Association.

Other officers are: **Richard T. Todhunter, Jr.,** vice-president; **Robert T. Laing,** secretary and treasurer; **C. P. O'Neill,** assistant treasurer; and **Frank G. Smith,** counsel.

Paul L. Shields, veteran of 34 yr in the coal industry, has retired as president and general manager of Spring Canyon Coal Co. and Royal Coal Co., Salt Lake City, Utah. His successor was not named immediately. He also has resigned as an NCA director.

Joseph H. Reitz, formerly district manager of northern coal mines, Republic Steel Corp., has been appointed safety manager. He is succeeded by former general superintendent J. N. Hedding.

John L. Schroder, Jr., has been appointed general superintendent, Lynch District, United States Steel Corp.'s Coal Division.

He succeeds **T. E. Johnson,** who was named special representative, southern district of the coal division.

Mr. Schroder was graduated from West Virginia University with a degree

Announcing

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CRADLE IDLER AND BELT CONVEYOR

McNALLY CRADLE

THE IDLER THAT BABIES YOUR BELT CONVEYOR

A SIGNIFICANT IMPROVEMENT

that cuts over-all handling costs

CHECK THESE FEATURES

1. Simple Design
- rugged, simple construction
- less framework
- extremely versatile

2. Easy Erection
- H-frames shipped assembled with return idlers
- pipe stringers shipped in random or mill lengths
- pipes can be joined to suit stock
- pipes field-welded to H-frames
- Cradle Idlers clamp on pipe stringers

3. Reliable Operation
- adjusts to any belt profile by means of ball joints
- easy to align for belt training
- U-clamps on idlers provide easy alignment
- scrapers on all return idlers

4. Minimum Maintenance
- lifetime sealed, prelubricated, precision ball bearings
- number of bearings varies with belt width
- wire rope does not rotate
- no complex support structure

5. Increased Belt Life
- each idler roller absorbs shock
- full belt support under all conditions
- no creasing or cutting of belt
- cradling of idler increases belt life

6. Greater Carrying Capacity
- less spillage
- Cradle Idlers are troughed at a 30 degree angle
- larger lumps are handled easily

7. Low Cost

McNally Pittsburg Cradle Idler Belt Conveyors are designed to meet specific handling requirements. We cover complete specifications on drives, control, and special equipment to meet unusual requirements. McNally engineers will be glad to work out your designs with you.

IDLER H-FRAMES Simple H-frames provide support for the McNally Pittsburg Cradle Idler. These frames consist of two vertical pipes interconnected with a single length of angle iron, and a bar which serves as a scraper for the return idler. This lightweight H-frame requires holes only for the return idler assembly, thus reducing costs of shop fabrication. Return idlers are bearing-mounted on horizontal plates attached to the pipe supports and can be adjusted easily and quickly. The H-frames are shipped assembled with the return idlers in place. "Shorty" frames are also available for underground installations.

The McNALLY PITTSBURG

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THE IDLER THAT BABIES YOUR BELT CONVEYOR

Here is a major improvement in Belt Conveyor Equipment. A new, exclusive* design makes possible accurate engineering to job requirements; provides greater capacity and faster operation with a minimum of spillage. The McNally Pittsburg Cradle Idler is extremely versatile in application—and life expectancy of belts and idler assemblies is substantially increased. Yet, because of its simplicity, *costs* are lower—erection time is reduced to a minimum.

The McNally Pittsburg Cradle Idler* Assemblies are readily adaptable for replacement in almost any type of existing application.

For your new cost-saving Belt Conveyor installation—for your replacement needs—mail post card today for complete information.

New McNally Pittsburg Cradle Idler* (a true catenary suspension) is the secret of the improved efficiency of this modern Belt Conveyor. It consists of 5″ rubber rollers assembled on precision ground ball bearings—prelubricated lifetime sealed. Rollers are mounted on flexible NONROTATING, stainless steel wire rope, thereby eliminating "loping" and dangerous harmonics. The assembly, supported by a ball joint, is attached to a U-clamp on pipe or wire stringers.

*Patents Pending

Gentlemen:

☐ Please send us your new bulletin, "McNally Pittsburg's New Cradle Idler and Belt Conveyor."

☐ Our conveying conditions are:

1. Type of Material—coal, sand, gravel, etc.
2. Material Characteristics—dry, wet, abrasive, etc.
3. Size of Material—normal screen size, maximum lump, weight per cubic foot
4. Conveying Capacity—tons per hour of material
5. Belt Slope—degree of incline or decline
6. Conveyor Length—pulley center-to-center distance

Name_____ Title_____

Company_____

City and State_____

c

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New Might! New Models! New Money-Saving Power!

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Good news in the light-duty class! Chevy's longer, stronger '59 line gives you a *dozen* big pickups to choose from . . . new 4-wheel drive models, newly fashioned panels, Step-Vans, and Sedan Deliveries! Scores of innovations include new hard-pulling Positraction rear axle, new bigger brakes, new stronger cabs, new broad-shouldered styling refinements!

Bright new middleweight and heavyweight might! New big-tonnage L.C.F. and conventional trucks are heftier than ever with new 5-speed transmissions, new huskier clutches, more durable rear axles in capacities as high as 18,000 lbs.! G.V.W.'s go up to 36,000 lbs. in tandems . . . and up to 21,000 lbs. in new Series 50H and 60H models with heavy-duty components!

New thriftier 6's, all-new V8 power! Chevy's best selling 6's are set to pinch pennies like never before with new camshaft design, new valve train durability! *Six* modern V8's are tougher built for bigger savings; an all-new V8, the 185-h.p. Workmaster Special* with advanced Wedge-Head design, is offered in Series 70 and 80! See 'em for yourself—the bright new trucks of Task-Force 59 at your dealer's now! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

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People in Coal *(Continued)*

in mining engineering in 1939, and received his master's degree in mining engineering in 1941. He joined the H. C. Frick Coke Co., a division of U. S. Steel in 1941 as a junior engineer. From 1944 to 1946, he served in the U. S. Navy.

Returning from service, he joined the Gay Mining Co. In 1949, Mr. Schroder returned to U. S. Steel as assistant engineer—mine planning in the Gary, W. Va. district. He successively became assistant chief engineer, chief engineer and, in 1958, was appointed acting general superintendent, Lynch district, the position he held prior to his present appointment.

Walter F. Schulten, vice-president, Consolidation Coal Co., is the new president of Fuels Research Council, Inc.

Other newly-elected officers are: vice-president, **Fred K. Prosser,** Norfolk & Western Railway Co.; secretary, **Robert E. Lee Hall,** NCA general counsel; and treasurer, **Tom Howarth,** NCA secretary.

In addition to Mr. Schulten and Mr. Prosser, new directors are: **Frank W. Earnest,** Anthracite Institute; **J. J. Foster,** Island Creek Coal Co.; **E. J. Kerr,** The B&O Railroad Co.; **Frank Nugent,** Freeman Coal Mining Corp.; **George E. Owen,** Imperial Coal Corp.; **Tom Pickett,** NCA; and **J. W. Stewart,** Reading Co.

Harold A. Montag, commercial research director, Joy Mfg. Co., has been named advisor for mining machinery in the agricultural, construction, and mining equipment division of the Business and Defense Services Administration.

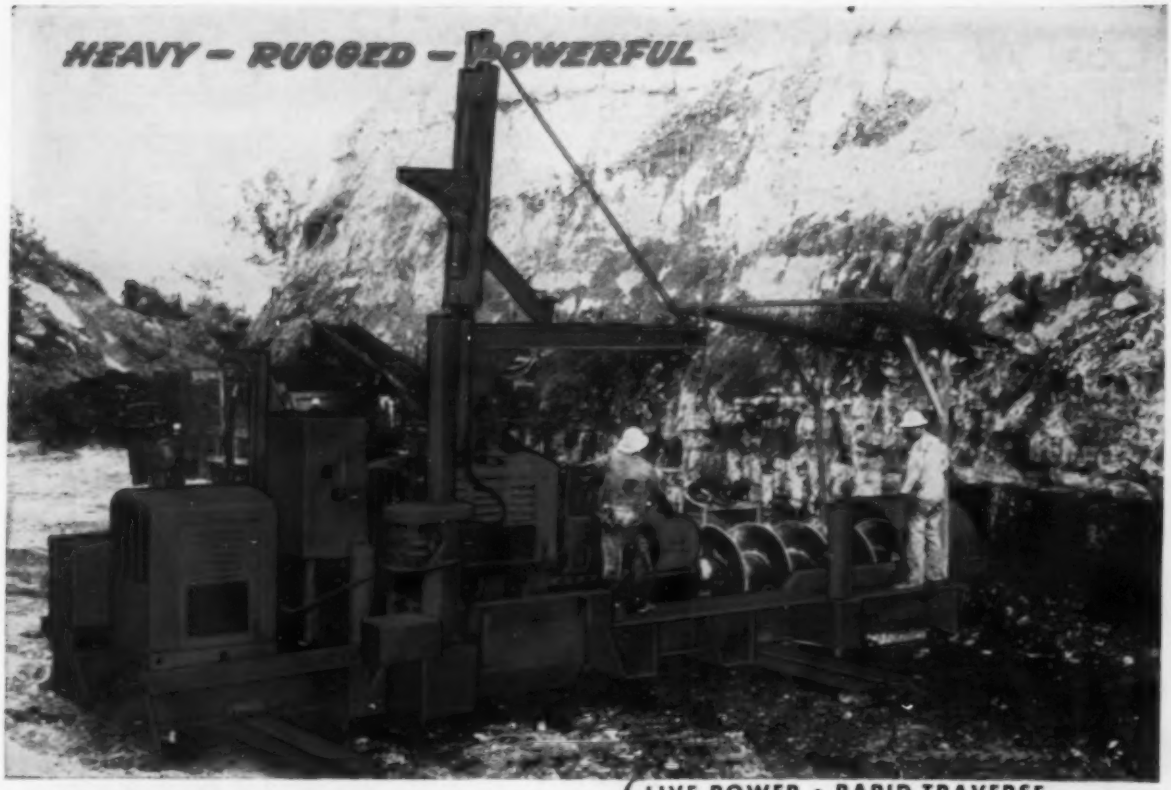
He will serve without compensation on loan from his company under an arrangement which makes key executives available for temporary BDSA service.

Mr. Montag was with the War Production Board in World War II, and was director of the mining machinery division of the National Production Authority during the Korean conflict.

James S. Gelston has been promoted to manager of mines and vice-president of Allegheny-Pittsburgh Coal Co. Windsor Power House Coal Co., subsidiaries of West Penn Power Co. He formerly was mining engineer at Cabin Hill, Pa.

A 24-yr veteran, Mr. Gelston began as a chainman with Windsor Coal in 1934. He served as resident engineer at Springdale until 1946, when he returned to the general office.

Jesse O. Williams, Providence, Ky., of Hart & Hart Coal Co., has been re-elected president of the Kentucky Reclamation Association.



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COAL RECOVERY DRILL

"Walks" from hole to hole to auger high quality coal

An Ohio miner removes 550 tons of coal in each 8-hour working day with this Model 15 36-42x12' McCarthy drill, operated by two men. He drills 42" dia. holes 144' deep. Auxiliary conveyor eliminates spillage at hole. It operates on either side of drill for working blind cut. Twelve different models of McCarthy Coal Recovery Drills mine low-cost "bonus coal".

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World's Fastest Heavy-Duty Vertical Auger Drill

Bores faster, deeper, larger dia. holes than any other auger drill. New gear reduction unit slows auger rotation for operation in hard rock formations. Drills 8" and 9" dia. holes readily in shale and sandstone formations, drills larger dia. holes up to 24" dia. in softer formations.

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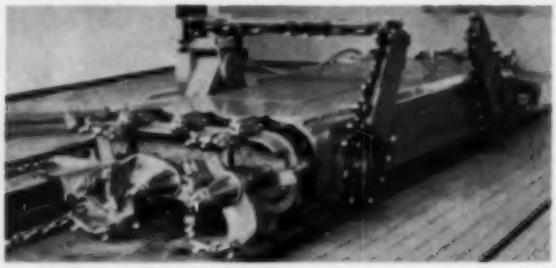
Lowest Drilling Costs per Foot, Self-Propelled or Truck-Mounted

Bores up to 12" dia. holes to 150' depth faster, cheaper than any other horizontal drill. Requires less working space, saves many man-hours . . . operates easily in tight, hard-to-reach locations.

FINGER-TIP CONTROL
Gives Desired Rotating Speed of Auger

HYDRAULIC FEED
Provides Any Speed up to 6 Feet per Minute Horizontal Feed of Drill

Coal Abroad



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PARIS, KENTUCKY

SALMON & CO., Birmingham, Alabama
WESTERN SALES ENGINEERING CO.,
Salt Lake City, Utah

German Mining Equipment Shown

A number of the pieces of equipment shown at the recent German Mining Show lend themselves to American mining practice.

One of the more notable exhibits was the continuous miner built by Korfmann (picture above). The unit is a three-head boring miner that comes fitted with two separate trim chains. The top chain is designed for hydraulic lowering and raising while mining to give instantaneous control of the cutting height to follow any seam. The miner claims to be able to cut entries at 30-deg pitches.

Self-Dumping Hauling Unit

Designed primarily for underground hauling was a light-weight unit exhibited by Becker-Pruente (picture above). A series of light-weight, wheeled skips are united end-to-end by sections of rubber that are wide enough to permit the unit to negotiate tight curves and turnouts.

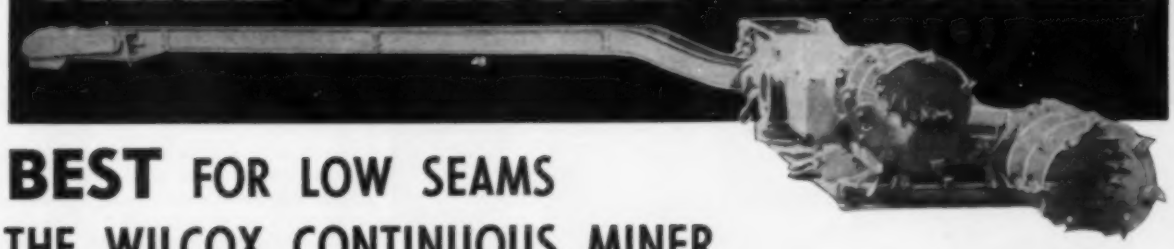
The rubber connection pieces between skips allows the train to run over a section of upward-curved dumping rails so arranged that the skip wheels cannot jump the tracks as the skips themselves are tipped to the side to dump their load into a discharge pit or waiting cars. The long train of skips is loaded in the normal manner for conveyor belts. It is pulled to the discharge point by a locomotive.

For Long-Wall Mining

Another mining attraction was a 80-kw shearer-loader built by Eickhoff (picture unavailable) for long-wall mining. The German unit is fitted with an additional roof-cutting drum that is hydraulically powered to follow the course of the seam.

The tungsten-carbide tipped picks on both drums plough out the coal which is flung onto a deflector plough before being dropped onto the face conveyor. Maximum cutting height of the roof drum is 7-ft with a 1-ft spacer in the drum arm.

TRIED - TESTED - PROVEN



BEST FOR LOW SEAMS
THE WILCOX CONTINUOUS MINER

Now in the fourth year of producing coal from Alabama to Nova Scotia and as far west as Oklahoma . . .

HAS BEEN PROVEN

- *By producing coal in seams ranging from 28 to 46 inches thick*
- *By producing coal under roof conditions where other mechanical equipment has failed*
- *By producing coal with lower maintenance cost per ton than any miner on the market*
- *By producing up to 60 tons per man per shift*
- *By its unparalleled safety record*
- *By repeated orders of 95% of our customers from 1 to 12 miners per customer*

THESE FACTS along with the low initial cost, the low 25½ inch overall height, and many other features of the Wilcox Continuous Miner have been responsible for opening many new seams throughout the country.

THE WILCOX CONTINUOUS MINER IS YOUR ANSWER FOR MORE TONS PER MAN AT LESS COST PER TON

For additional information call CLifford 2-6555 Beckley, West Virginia, or write

WILCOX MANUFACTURING COMPANY

P. O. BOX 217 **RALEIGH, WEST VIRGINIA**

Freely oscillating vibro-feeder, 2 x 15 ft, for bituminous coal, serving as bin bottom and feed element to belt conveyor. Feeders of this type are available with capacities to 600/800 tph.

Dravo-Schenck Vibro-Feeders
CUT MATERIALS HANDLING COSTS

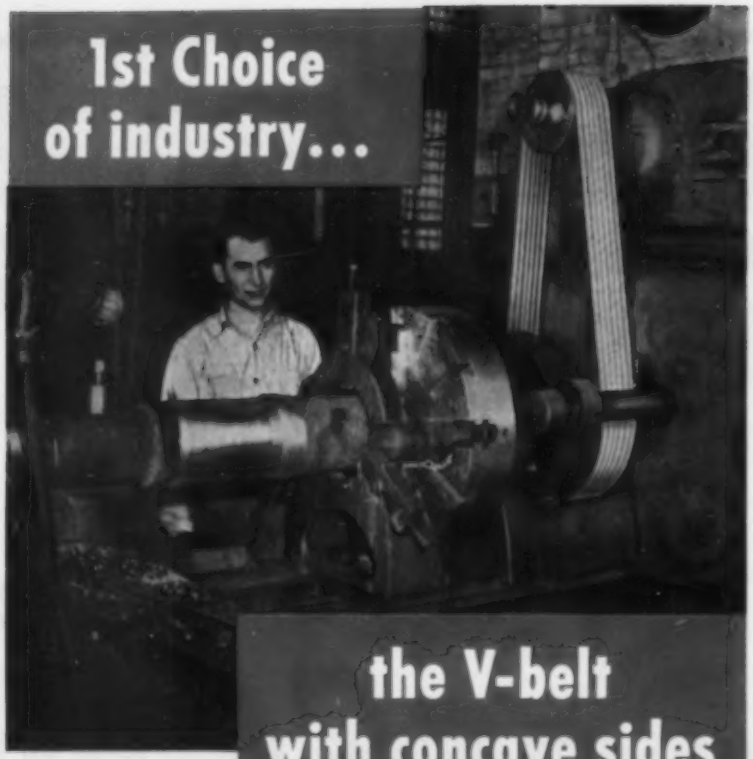
Because it is built to stand up under the punishment that hot, abrasive or other hard-to-handle materials deal out, Dravo-Schenck vibro equipment keeps maintenance costs down. All wearing parts are ruggedly built, and the unique "Micro-Thrust" exciter unit reduces wear by moving material with minimum contact with troughs or screens.

Cost-cutting, heavy-duty Dravo-Schenck screens, conveyors and feeders are at work in a wide variety of applications—handling such difficult materials as coal, ferrous and non-ferrous ores, sinter, chemicals, cement clinker, and crushed stone.

Our engineers will gladly work with you on specific problems. For information, write for Bulletin No. 1475, Dravo Corporation, Pittsburgh 22, Pennsylvania.

DRAVO
CORPORATION

1st Choice of industry...

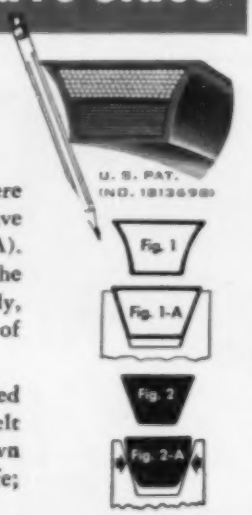


the V-belt with concave sides

Here's why:
The Concave Sides of Gates V-Belt *insure* longer life... lower costs

Try this. Bend a Gates V-Belt as if it were going around a sheave. Feel how the concave sides (Fig. 1) *fill out*... become straight (Fig. 1A). This precise fit insures full contact with the sides of the sheave... grips the sheave evenly, distributing wear uniformly across the sides of the belt. Uniform wear lengthens belt life.

Make the same test with a straight-sided belt (Fig. 2). Feel how the sides of the bent belt *bulge out*, concentrating wear at points shown in Fig. 2A. Uneven wear shortens belt life; increases costs.



Because Gates V-Belts with Concave Sides are so universally preferred, they are also the *most widely available*. Gates V-Belts are carried by leading distributors in industrial centers throughout the world.

The Gates Rubber Company, Denver, Colorado

Gates — *World's Largest Maker of V-Belts* — TPA 342

Gates VULCO ROPE Drives

Coal Abroad (*Continued*)

JAPAN

Alaskan Coal Investigated

Japanese steel and mining interests have been investigating coal deposits in Alaska, seeking a new supply of coking coal.

Samples of semi-bituminous coal from the Bering River coal deposits near Cordova are currently being run through coking tests in Japan. The Jewell Ridge Coal Corp., Tazewell, Va., long-time suppliers of coking coal for Japan is working with the Japanese in exploring the possibilities of the Alaskan coal. Jewell Ridge has the fields on a long-time lease from the government.

Cost for developing the estimated 900-million tons of coal reserves is approximately $150-million. Japan reportedly is willing to finance the project if the coking-test samples prove satisfactory.

NEW ZEALAND

Overburden Dredging

A $500,000 cutter-suction dredge now being built will take 230-ft slices off the overburden that lies above 5-million tons of coal under Lake Kimihia. The coal will then be mined by opencast methods once the lake has been drained and the remaining overburden removed.

The unique unit will consist mainly of a large steel pontoon to support a long shaft, at the end of which will be the cutter propeller. This will be lowered into the soft bottom of the lake.

The churned-up solids and water will be pumped up and carried away by a pipeline. After the first slice has been removed, the water level will be lowered and the procedure repeated. The dredge will then be removed and the area pumped dry.

OVERSEAS FLASHES

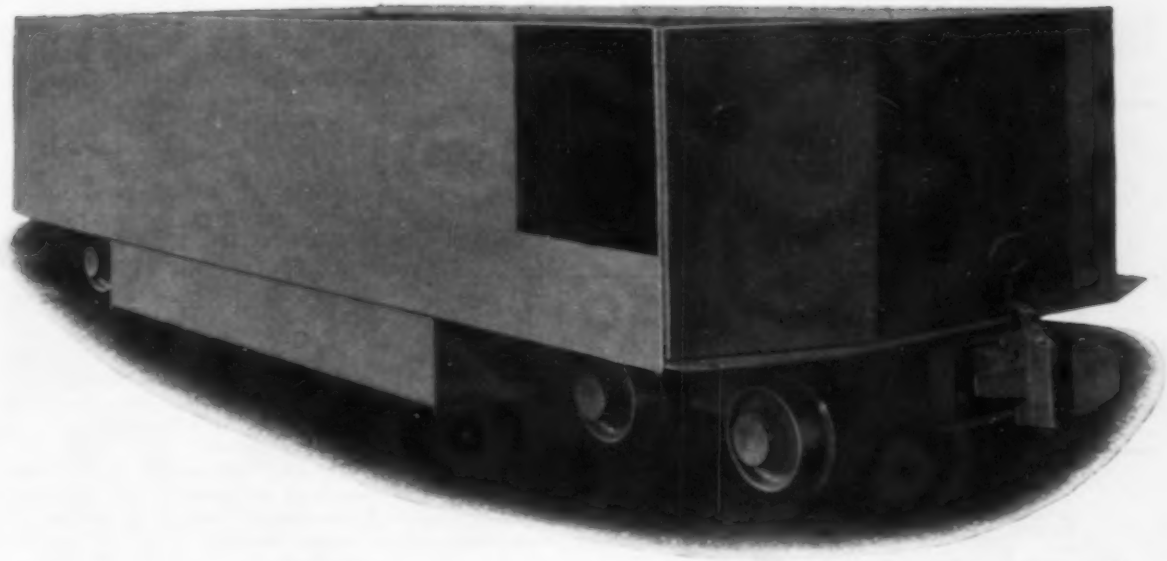
AUSTRALIA — Nearly $20-million will be spent this year to speed up the mechanization of coal mines in the state of New South Wales in an effort to make Australian coal more competitive in foreign markets.

Vigorous efforts are being made to further expand the Far Eastern market, and the next step is a campaign to sell up to 3-million long tons of coal to South American countries. A special mission probably will be sent to South America soon to offer Australian coal at attractive prices. The Australian coal industry hopes eventually to export seven to eight million long tons of coal a year.

AUSTRIA — The coal industry has

LOW

but we didn't skimp on capacity



Bethlehem built this car for a customer with a problem. He needed a low car, and he didn't want it excessively long. Yet, at the same time, there had to be plenty of capacity. Bethlehem engineers worked up a design that filled the bill completely.

The finished car stands only 4 ft above the rails. Its inside length is 16 ft 6 in. Capacity (level), 390 cu ft; with 6-in. surcharge, 446 cu ft. Nominal load capacity, 11 tons.

Equipment includes automatic couplers, spring draft gear, forged-steel wheels, and fabricated trucks with roller bearings. Body parts in contact with the lading are corrosion-resistant steel.

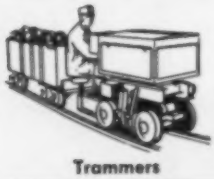
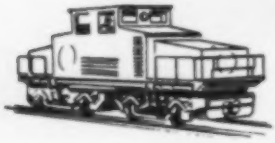
When you decide to expand your own fleets of cars, let Bethlehem quote you. We are set up to construct any welded or riveted model for end-dump or rotary-dump service. Details of design and engineering can always be worked out to meet your requirements.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

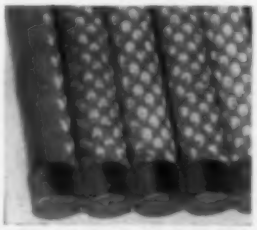
NEW EXIDE-IRONCLAD LOCOMOTIVE BATTERIES PACK UP TO 45% MORE POWER

APPLICATION	NEW TYPE BATTERY	CAPACITY PER POS. PLATE	REPLACES BATTERY TYPE	PERCENT CAPACITY INCREASE
 Trammers	MG	45 ah	MVM ML	32.4 17.5
Mine locomotives	RG	55 ah	ML TLM	43.6 5.0
Shuttle cars	TG	72 ah	TLM TH	44.0 20.0
 Battery locomotives	TEG	95 ah	(new type—no prior data)	
	MEG	145 ah	MEH MEX	45.0 21.0

Boost the work capacity of your locomotives

These new, advanced Exide-Ironclad Batteries pack more power in the same space. They equip your present locomotives to do more work. And they actually cost less per ampere-hour, promise even longer life of service. Get complete information. Call your nearby Exide representative. Or write Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide



THE SECRET. New tubular construction packs more power in each positive plate . . . prolongs battery life.

Coal Abroad *(Continued)*

petitioned the government for permission to raise the price of domestic lignite coal between 5 and 8%. They cite the recent start of the 45-hr work week for coal miners as the reason for the price boost. The government has not officially decided on this application so far, but has informally approved the petition. A coal industry petition to levy a surtax on imported solid fuels to discourage imports has received negative response.

BRITAIN — The nationalized coal industry here has reached another of its periodic crises, with 15.5-million tons—about $187-million worth — of unsold coal on its hands.

This is nearly double the unsold stocks on hand a year ago, in spite of reduced production. Total production to date this year is 164.3-million tons compared with 170.9-million tons at the same time last year. Employment is 191,000 as against 710,000 12-mo ago.

Prospects are probably non-existent for substantially reducing unsold stocks — mostly small grades — in the near future. One of the principal causes is the slump in British industrial activity, which shows no immediate signs of improvement.

CZECHOSLOVAKIA — Lowest grade Czech brown coal—containing 40% water and having an ash content ranging between 15 and 20%—will be utilized in a gas work now under construction.

The method to gain gas from this otherwise unusable coal operates with the aid of oxygen and steam. The gas yield from the charged material amounts to 57% of total charge. Aside from gas, chemicals such as tar, phenole, and sulfur are extracted.

The plant will yield 475-million cubic meters of gas annually from 1.8-million metric tons of brown coal. The cost of the gas is claimed to be 50% of the cost level of gas derived from gasification of best quality hard coal.

POLAND — The Polish coal export monopoly, WEGLOKOKS, announced that contracts for the export of 16.2-million metric tons were received in the first 9-mo of 1958.

Of this amount, Western states bought 8.7-million tons and "socialist" countries bought 7.5-million tons. The sales agency hails this as a great success, pointing at the growing coal piles in Western coal fields.

RUSSIA — PRAVDA claims that during this year, the Soviet Union will have gained the lead in the world's coal production, thus surpassing the United States.

The paper states that the 1958 coal output in the USSR will amount to 500-million tons.

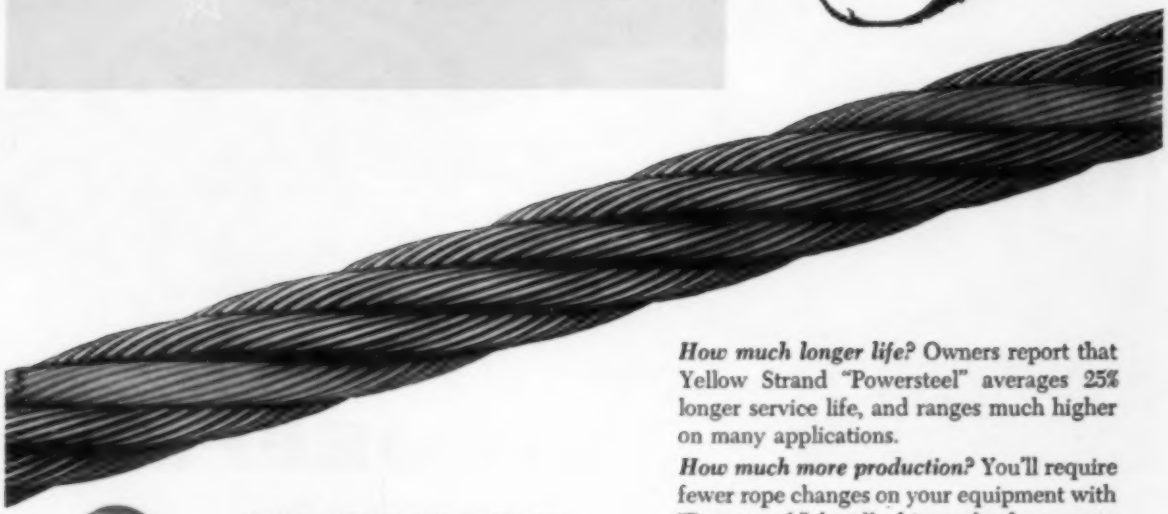
"POWERSTEEL"®

WIRE ROPE

PAYS OFF

Longer Life

Higher Production



NEW! YELLOW STRAND WIRE ROPE CLIPS...

Ask for them at your Yellow Strand Wire Rope Distributor. Heavy-duty galvanized steel U-bolt. Drop-forged steel saddle, hot dip galvanized. Easily applied.

How much longer life? Owners report that Yellow Strand "Powersteel" averages 25% longer service life, and ranges much higher on many applications.

How much more production? You'll require fewer rope changes on your equipment with "Powersteel," handle bigger loads, operate larger machines. You'll get greater production and more profit . . . less "downtime" and lower operating costs!

"Powersteel" is an extra high-strength rope for heavy loads and abrasive conditions. It spools freely, resists wear and crushing, and was developed for your high speed, high production equipment.

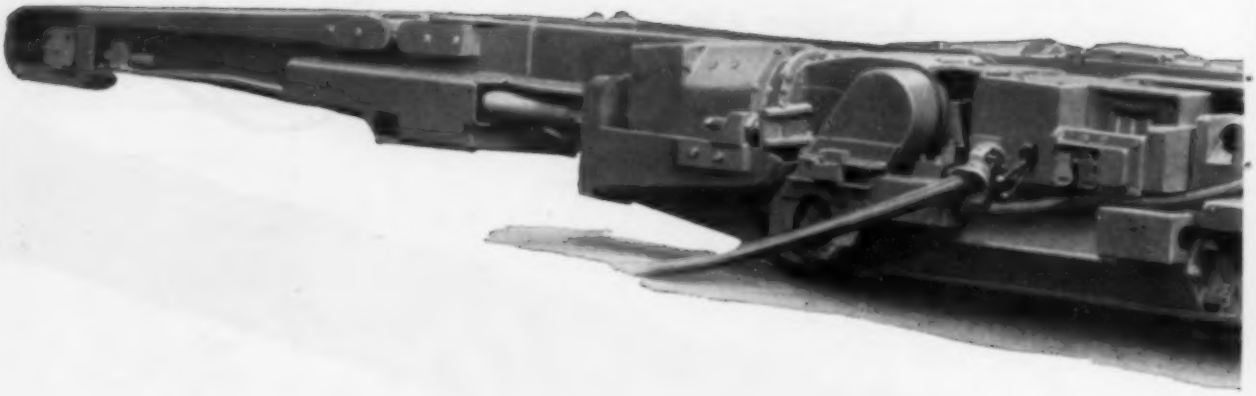
Your nearby Broderick & Bascom Distributor stocks an ample supply of Yellow Strand "Powersteel." See him for complete details. Broderick & Bascom Rope Co., 4203 Union Boulevard, St. Louis 15, Mo.

Yellow Strand®

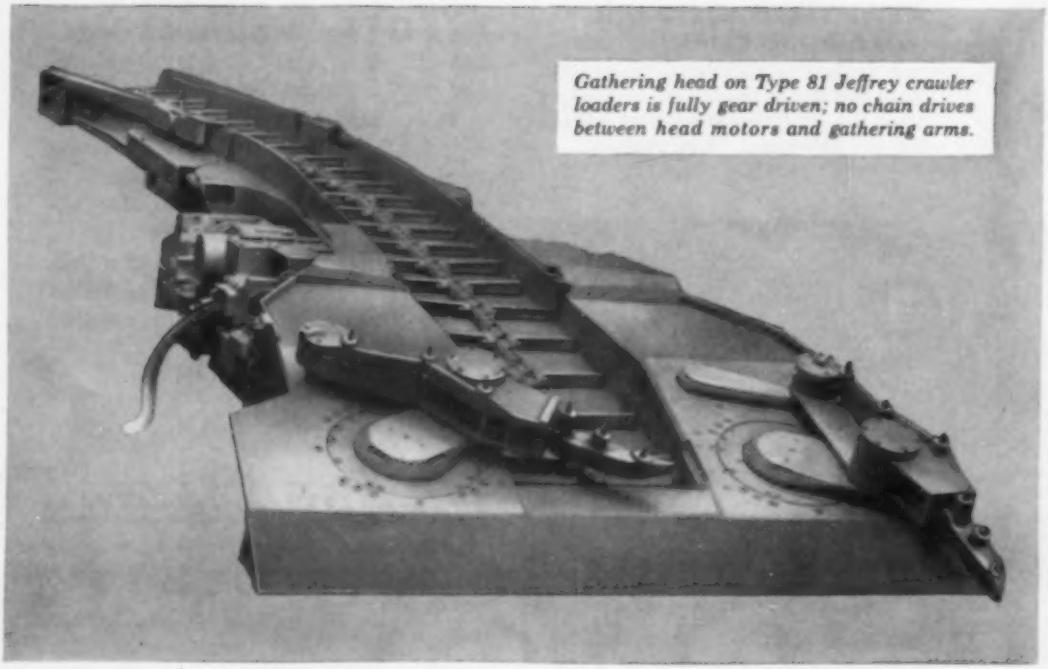
Quality WIRE ROPE since 1876

for high capacities in low

400 tons per shift

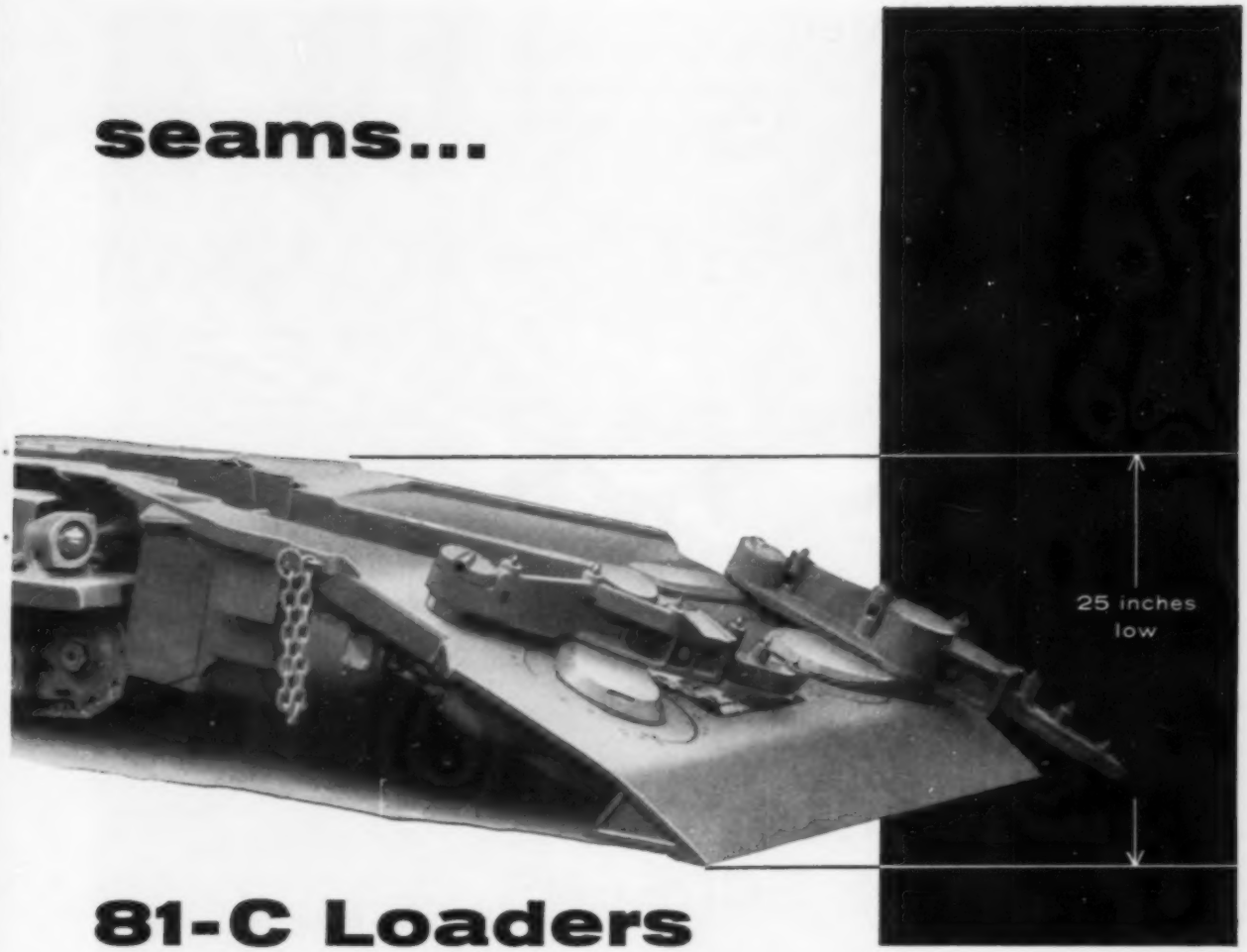


JEFFREY



Gathering head on Type 81 Jeffrey crawler loaders is fully gear driven; no chain drives between head motors and gathering arms.

seams...



81-C Loaders

Just 25 inches high, this newest Jeffrey crawler loader is ideally suited for low seam work. Offers the same time-tested features that made Jeffrey's 81-A and 81-B loaders so popular... fast, easily maneuvered, highly productive.

The Jeffrey 81-C loader is powered by four 15 HP electric motors and a 4 HP hydraulic motor... power for the toughest jobs. It has a rated capacity from 6 to 10 tons per minute... averaging 400 tons per shift in 33" seams, keeping loading costs to a minimum. Moves fast from place to place, hits loading stride quickly and stays on the job until the work is done.

Like all Jeffrey mining machinery, Jeffrey loaders are available for either AC or DC power. With Jeffrey equipment you can make your mine all-AC.

Flexibility built into the Jeffrey loader lets it work most efficiently with other face equipment and the same mining cycle. Conveyor swings 45° either side of center and elevates properly to load shuttle cars on the straight or in break-throughs. Can be turned in its own length.

THE JEFFREY MANUFACTURING COMPANY
912 North Fourth Street, Columbus 16, Ohio

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

Current Coal Patents

By Oliver S. North

Pick boxes for coal and like cutting machines, J. A. Cook, Sept. 23, 1958. Improved construction for pick boxes for coal cutting machines, and means for securing picks therein so that it is impossible for them to become detached during operation of the machine. No. 2,853,283.

Mining machine, A. W. Calder (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Sept. 23, 1958. In a substantially automatic continuous mining machine, an electrical contact device, or timing means, operates in conjunction with certain elements which control the means to move the machine through its cycle of operations. The means to operate the machine are hydraulic means, and the electrically-operated control means include valves in the hydraulic conduits. No. 2,853,566.

WISSCOLOY® SPACE SCREENS

You cut screening costs right from the start, when you use CF&I Wisscoloy Space Screens . . . these rugged, general-purpose space screens are economy-priced.

What's more, you continue to save on cost-per-ton of coal screened . . . because Wisscoloy Space Screens are made to exacting standards, from tough, special alloy steel wire that's tightly woven, carefully crimped. The result is a quality screening that provides maximum accuracy plus long life. *Other CF&I Space Screens solve specific coal screening problems:*

CF&I Manganese Space Screens—are extremely shock-resistant, last longer on scalping operations and other tough screening jobs.

CF&I Stainless Steel Space Screens—give top quality performance in washing and other operations where wet, corrosive materials must be processed.

There's a CF&I Space Screen designed to meet your coal screening requirements. They're furnished in a wide range of standard dimensions, can be supplied with any specified edge preparation. Contact the CF&I sales engineer in our office nearest you.

6275

CF&I SPACE SCREENS
THE COLORADO FUEL AND IRON CORPORATION

In the East
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York Philadelphia

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THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte Denver • El Paso • Ft. Worth • Houston • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland Pueblo • Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita
CF&I OFFICE IN CANADA: Montreal
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

Power driven conveying mechanism, J. B. Long (assigned to The Long Co., Oak Hill, W. Va.), Sept. 30, 1958. Construction of an improved lightweight intermediate transfer conveyor which is relatively long, low, and slender, and is particularly useful when working in thin coal seams. Tendency to become sway-backed under abnormal loads is lessened; further, if it does become sway-backed it may readily be rendered normal at a comparatively low cost. No. 2,854,129.

Method and apparatus for separating solid materials of different specific gravities, P. H. Gillie and W. H. Noone (assigned to Allied Chemical Corp.), Sept. 30, 1958. Efficient and economical method and apparatus for classifying a mixture of raw coal in a sand-water medium to produce a clean coal with a lower ash content at a high rate of throughput. The coal-sand-water mixture is agitated, and the coal caused to float on the heavier material and discharge through a product chute. (Fig. 1 is a good diagrammatic perspective representation of the apparatus). No. 2,854,136.

Wash box discharge control, C. M. Kazmier and W. Carlson (assigned to Link-Belt Co.), Sept. 30, 1958. Automatic discharge control for an air pulsated coal wash box which varies the rate of discharge of the high specific gravity stratum in accordance with the pressure of air in the box. The control means is easily maintained, readily adjusted, and affords a high degree of accuracy. No. 2,854,139.

Equipment for operating in mines, G. W. Benjamin (assigned to Otis Elevator Co., New York, N. Y.), Sept. 30, 1958. Design for a motor-driven truck provided with a boom-supported mechanism adapted for sinking drill holes and for engaging and rotating the heads of roof bolts. The end of the boom has a power-driven shaft for rotating a drill or roof bolts. No. 2,854,217.

Method of erosion control of mineral products, R. B. Booth and J. A. Melchore (assigned to American Cyanamid Co., New York, N. Y.), Sept. 30, 1958. Method for preventing wind and rain loss of mineral fines piled in the open, being transported in open cars, or otherwise exposed to the elements. The method is particularly applicable to the finer sizes of coal. For example, barley anthracite was sprayed with a small amount of a rubber latex to form an impervious, resilient film or surface coating which protected the pile against rain and wind. In other examples cited, coal dust and fines were rendered weather-resistant by forming over the material thin "skins" of an emulsion of a copolymer of butadiene and styrene. No. 2,854,347.

Twin-screw diesel towboat *Humphrey*, 132' x 27' x 9'6".

New Dravo towboat for Consolidation Coal

Lower costs per ton mile, a major aim of Dravo's extensive marine research program, have been designed into the new 1,600-horsepower towboat *Humphrey*.

Now operating on the Monongahela, Allegheny, and upper Ohio Rivers, the *Humphrey* is the most advanced and efficient towboat of her draft on the inland waterways.

Here are some of the things that make her so:

New hull design with longer, leaner stern lines and broader stern tunnels produces more push with less power. Steering and flanking rudders have been reshaped and relocated for better flow characteristics. Kort nozzle shape has been refined for greater thrust. Struts are located aft rather than forward of the seven-foot, stainless steel propellers which have been modified for more efficient use of engine power.

All exposed surfaces of the Kort nozzles, rudders and aft end of the hull are protected from corrosion by stainless steel.

The *Humphrey* is the fourth towboat in Consolidation Coal's fleet—all have been built by Dravo.

For more information, contact DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION

ON COMPLETION of a modernization program at Island Creek Mine 23 near Ragland, W. Va., these men are about to inspect the installation of 18 new automatic electric switch throws. They are: left to right, J. J. Curry, assistant mine foreman; William Vance, American Mine Door Co.; John Welch, section foreman; Alex Matney, assistant superintendent; and Jack Cline, section foreman.

News Roundup (*from p. 28*)

the commission says should be discharged by the board of transport Commissioners.

In addition, the commission calls for the repeal of a present regulation which forbids sale of gas outside Canada at lower prices than those at which it is sold in Canada.

The commission urges closer integration of the regulatory bodies of Canada and the United States by intergovernment negotiations.

It suggests that a member of the projected National Energy Board have a non-voting seat on the Federal Power Commission when that group is considering a case involving Canada, and that a member of the FPC sit in on hearings of the National Energy Board in cases involving the U.S.

The commission's report has drawn serious attention in U.S. coal circles.

Although the report contains only suggestions, which are not yet law or fixed policy, the general attitude of finding it "desirable" to export natural gas and crude oil to the U.S. poses critical problems for coal men.

An invasion of Canadian gas into the Midwest (its most likely channel) would push domestic gas supplies even more heavily into the East Coast area—thus hitting hard at coal's primary market.

Still remaining to be seen, however, is whether and to what extent the committee's suggesions will be put into action, and the attitude and action of U.S. government agencies in governing these imports.

Remote Control Mining System

A remotely controlled continuous mining system will be in commercial production in about 18 mo, according to W. L. Wearly, president of Joy Mfg. Co.

Joy and Union Carbide Corp. have signed an agreement that gives Joy the right to manufacture, use, lease, and sell a remotely controlled continuous mining system. The equipment was originally developed by Union Carbide Olefins Co., a division of Union Carbide (*Coal Age*, December, 1952).

The system is operated by a man at an electronic control center actuating the mining machine, which can penetrate highwall coal to a depth of 1,000-ft or more.

The continuous mining machine is equipped with sensing elements which electronically report to the operator outside the mine whether the machine is properly heading into coal. With this information, the operator electronically guides the course of the machine to follow the coal seam.

A prototype machine has proven capable of advancing an entry at a rate of more than 100 ft per hour.

The mining machine automatically loads coal onto a heavy-duty continuous transport system that follows the machine into the mine and delivers the coal to an outside discharge station. The transportation system is designed to operate in conditions where local roof falls may occur.

How Link-Belt electrically heated CA vibrating screens achieve

sharp sizing without blinding

FOUR LINK-BELT CA VIBRATING SCREENS size coal at preparation plant of Kentucky mine. Electric screen heater on second unit prevents blinding of cloth when handling fine coal.

SPRING CONTROLLED centrifugal weight type counterweight assembly eliminates excessive resonant motion (bouncing) of the screen while starting and stopping.

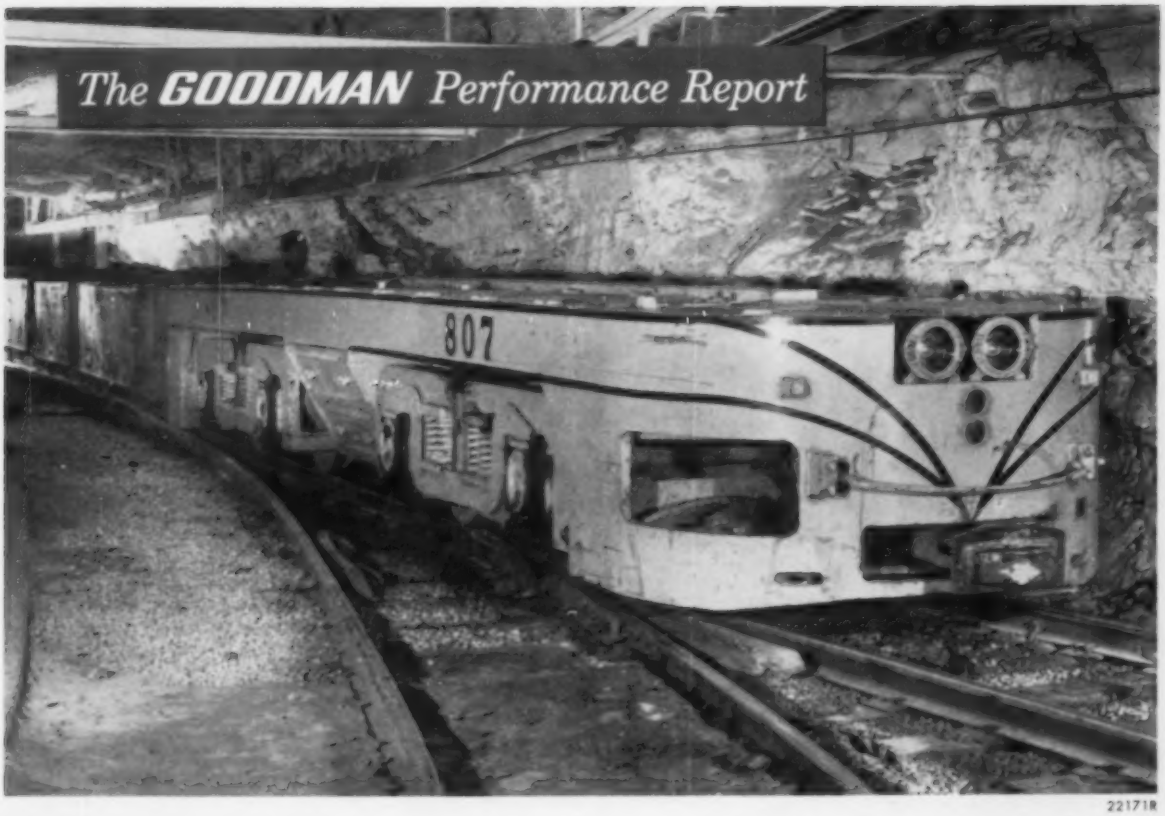
The smooth, powerful Concentric Action of Link-Belt CA vibrating screens assures fast, accurate sizing of all kinds of coal. And the Link-Belt electric screen heater prevents plugging and blinding of screen cloth . . . provides top performance when handling fine coal and other hard to screen materials.

One-deck, two-deck and three-deck CA screens are available in sizes from 4 to 6 feet wide by 8 to 14 feet long for a wide range of coal sizes. For additional information, call your nearest Link-Belt office. Or write for Book 2554.

LINK-BELT

VIBRATING SCREENS

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 20, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1. To Serve Industry There are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14.577



221718

How to Make Time on main line hauls

By "make time" we mean the efficient scheduling of main line haulage equipment to match productive output—to keep high tonnages flowing out of the mine. Goodman main line trolley locomotives provide the performance, power, speed and durability to "make time" . . . move more coal from *your* mine. Take for instance, the 27 ton, 8-wheel, 4-motor type 201 shown above operating on 36" gauge track in a large coal mine.

Powered by Goodman designed and built motors, with a high continuous rating for mine service, it delivers 496 horsepower and a standard speed of 10 mph. Power and speed combined with a starting drawbar pull of 16,200 lbs. and a rated running pull of 13,500 lbs. assure peak tonnages on every shift. A full magnetic, dual control circuit provides "no stall" operation while an independent 32 volt battery operated circuit maintains dynamic braking and headlights should the trolley pole become disengaged.

Weight of the locomotive is evenly distributed over the 8 wheels with a short overhang at cab ends that eliminates bouncing, and at curves does not throw the coupler far off track center nor require excessive rib clearances.

A short wheel base provides excellent track stability at all times . . . takes curves easily without jerks or heavy wheel flange pressures. Rigid framing assures permanent alignment of working parts.

These are just a few of the reasons why Goodman main line trolley locomotives will "make time" matching the productive output of your mine, for less money while doing it safely. Our engineers will gladly make an analysis of your present and future haulage needs. There's no obligation.

GOODMAN
MANUFACTURING COMPANY
Halsted Street and 48th Place, Chicago 9, Illinois

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SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

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Drills
Cutters
Loaders
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Locomotives
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. . . and all types of continuous mining equipment above and below ground.

Flat Twin Mining Machine Cable
(Types W & G)

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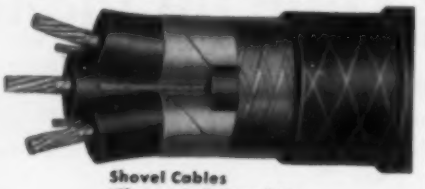
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INSULATED WIRE CO.
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News Roundup *(Continued)*

M. C. Kelce, president of Peabody Coal Co., St. Louis, which operated one of the early prototype machines for several months, says the system is particularly valuable for highwall mining.

A. L. Barrett, Joy's director of research and development, says the system might be made applicable to underground deep mines in 3 to 10 yr.

Army Keeps Coal

The Army Corps of Engineers has agreed not to switch from coal to any other fuels at Army installations until it considers the economic possibilities of installing modern coal equipment, according to the National Coal Association.

The Army also abandoned previously-approved plans to convert some 20 heating plants at Ft. Eustis, Va., from coal to fuel oil at a capital cost of nearly $1 million.

Instead, it accepted the recommendations of the NCA engineering department and other coal interests to modernize coal-handling equipment in most of the plants. The Ft. Eustis decision saved an annual market for about 25,000 tons of coal.

In addition, the Army says it will restudy a proposed conversion at Ft. Campbell, Ky., where a decision to switch to gas had been imminent. It also had planned fuel conversions at five other installations which, together with Ft. Campbell, use about 170,000 tons of coal a year.

The only heating plants at Ft. Eustis converted to oil will be those for miscellaneous buildings and 164 mobilization-type barracks, presently hand-fired by enlisted men.

NCA engineers recommended modernizing this coal equipment at a saving of about $70,000 a year, but the Army said the plan was not acceptable because of the policy of relieving GI's of this type of duty.

Rate Reduction Possible for Coal

There is a possibility that barge and railroad competition in the Midwest will result in cuts in coal rates.

Six Midwestern barge lines currently are fighting a proposed rate cut by competing rail lines in the haulage of printing paper from a new Southern mill to Chicago.

The proposed selective cut (amounting to more than 60%) is allowable under provisions of The Transportation Act of 1958. The act says that carriers do not

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O-B "cap screw" cable connectors

*you can connect this...**

- to any other single conductor cable
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- from 4/0 to 1,590,000 CM
- same size or different size
- straight-thru, tap-off, or three-way
- simply by tightening two cap screws!

When you leave one of these O-B connector halves semi-permanently attached to the ends of your cable, you can make any of the above connections in a minute or two simply by tightening two cap screws. All connectors have ample strength, current-carrying capacity equal to or exceeding that of the cables themselves. Smooth, slim contours tape easily, drag over rough bottom without snagging. Ask your local O-B representative or write us today for more information.

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Ohio Brass

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Three-Way Plate

Tee Connector

have your bolting crews seen it yet?

hold that roof
"suggested installation procedures for safe roof bolting"

a 27-minute sound-color film produced by Ohio Brass Co.

available through local O-B representatives for showings on your own property

already viewed by over 10,000 mining men!

see your O-B representative or write direct to Ohio Brass Co.

helping to

"Hold That Roof!" is the title of a 27-minute, sound-color film produced by Ohio Brass to promote a better understanding of bolting principles and practices among underground production workers and bolting crews. Using animated cartoons and on-the-spot photographs of bolting crews at work, the film describes in simple, easily understood terms current theories of roof support, correct installation procedures, drilling and wrenching techniques, hole size, installed tension, torque, and safety checks. Also shown are recommended safe procedures from the time the bolter enters the place to be bolted until the job is finished.

The film, which has already been shown to over 10,000 mining men, is available through local O-B representatives for scheduled showings at individual mine properties.

Why not ask your O-B representative for a "preview" showing to see how "Hold That Roof!" will fit into your bolting training program or safety campaign?

This 20-page pocket-size "safety reminder" booklet covers the important points made by the film, is distributed to members of the audience after each showing.

"hold that roof!"

OWB
SHELLS AND PLUGS

SHHH!
he's listening to a cable fault!

with the O-B Fault Locator

Because they're so hard to find, hidden cable faults often cause more lost production, more wasted man hours — more wasted cable, in fact — than the big faults that rupture insulation and actually destroy cable. That's why you'll find more and more mine properties today investing in O-B Cable Fault Locators, in many cases using as many as 10 Locators on a single property!

Powerful, compact (you can carry it in your pockets), rugged and virtually "tamper-proof," the O-B Locator pinpoints in a matter of minutes cable faults that would ordinarily take hours to find. The complete unit weighs only four pounds and consists of just four elements: battery and signal generator (being attached to cable end below), and headphones and slim transistor receiver. The latter, as shown above, are the only parts carried along the cable during testing! Takes only minutes to set up, tests cable up to 600 feet or longer, costs less than any cable you'll use it on! Write for complete information, or order Catalog No. 22567 to try it out for yourself.

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have to hold rates to a particular level to protect traffic of any other mode of transportation.

The barge lines, holding that the cut will be more than 50% lower than present rates on paper from mills in 16 other states now shipping to Chicago, argue that if this cut is permitted, the rates from the other mills also should be lowered.

A brief filed before the Interstate Commerce Commission on behalf of the barge lines says that "we have here the beginning of a rate war which the commission should nip in the bud."

Another recent rate cut under the new law also under attack by a water carrier is the one reducing rates from the Northeast to Texas on drugs and alcoholic beverages.

Neither of these two actions directly affect coal now. But there is a fair chance the hassel between water and rail carriers will benefit coal operators (*Coal Age*, July, 1958).

A rate war certainly wouldn't harm coal. And even if the situation doesn't develop into a war, the sharpened competition between the two carriers may easily lead into reduced rates for coal.

The growing trend for coal to take the water route because of cheaper rates undoubtedly has been felt by the railroads, whose largest single revenue producer is coal freight. Their fight to hold this "plum" may be a substantial help to coal.

Mine Drainage Aid

The Interior Department has approved the twentieth anthracite mine-drainage project proposed by the Commonwealth of Pennsylvania under a $17-million State-Federal program for relieving the mine-water problem in the hard-coal region.

Designed to remove the threat of sudden flooding at the Underwood and Olyphant mines near Scranton, Pa., the project is expected to cost about $360,000. It will involve moving more than 2 million cu yd of spoil bank material and fine coal to fill 17 strip pits which collect large amounts of surface water.

The Underwood mine, owned by the Pennsylvania Coal Co., employs 105 men and produces 100,000 tons of coal yearly. The Olyphant mine, one of the largest in the Lackawanna Basin of the northern anthracite field, is owned by The Hudson Coal Co. and produces nearly half a million tons of coal annually with a payroll of about 870. Between them, the two mines pump almost 8.7 million gal of water yearly to enable them to get the coal.

Approval of this latest project brings funds expended or committed under the cooperative program to more than $6 million, half contributed by the Commonwealth of Pennsylvania and half by the Government.

Coal Co. Builds Aggregate Plant

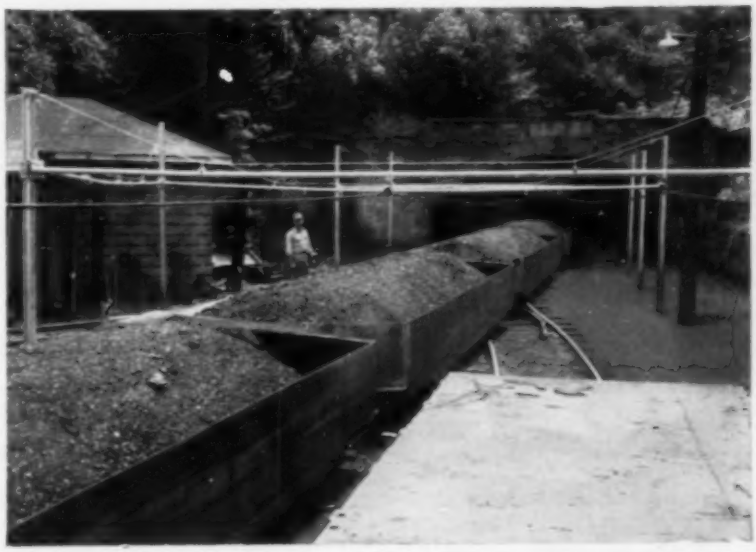
Clinchfield Coal Co., a division of the Pittston Co., will soon be producing lightweight aggregate.

The new plant, now under construction at Clinchfield, Va., was designed and is being built by Link-Belt.

It will use as its raw material shale from Clinchfield's new Moss No. 3 coal preparation plant, now nearing completion on the same site. The lightweight aggregate plant is expected to be in operation in January, 1959.

Lightweight aggregate is one of the fastest growing materials used in the construction industry, as it produces structural concrete which has only two-thirds the weight of gravel or stone concrete.

It is now widely used in concrete blocks and for concrete floors in tall buildings where its lighter weight per-



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Place Lundale, W. Va.
Operator Amherst Coal Co.
Car Dimensions Length: 24' 6"
Width: 8'
Height: 36" (above rails)
Weight: 9200# empty
Capacity 456 cu. ft. level load)
536 cu. ft. (crown load)

where can you match it?

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mits lighter steel supporting members. It also is used in pre-stressed concrete, a typical example being the beams that support toll road overpasses.

Lightweight aggregate also claims high insulating and fire resistance qualities.

Latest NCA Action

The National Coal Association Board of Directors has voted to continue the membership dues at 7½ mills per ton of production.

Other action taken at the October meeting, held in Washington, included directing the building committee to proceed with the construction of an office building in Washington, approving the budget for the coming year, and electing four new directors.

The new directors are: L. M. Cooley, managing partner, Edna Coal Co., representing Colorado and New Mexico area; Ralph J. Long, Ozark Philpott mine, representing the Arkansas-Oklahoma-Texas area; R. E. Moore, vice-president, Rich Hill Coal Mining Corp. representing Pennsylvania; and W. J. O'Connor, president, Independent Coal & Coke Co., representing Utah.

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*Acceptance designation: "Fire Resistant, U.S.B.M. No. 28-14".

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Mines, Companies

The Hudson Coal Co.'s Eddy Creek Colliery, Olyphant, Pa., has resumed operations after being closed for 6 mo.

Approximately 100 men are now working at the colliery. The number is small when compared with peak employment of close to 700 men, but mineworker's representatives are hopeful that more employees will be recalled as the task of clearing the underground workings progresses.

The turbine-type deep-well pumps at an estimated cost of $1.5 million in Federal and Pennsylvania state funds have been approved by the Interior Dept. for installation at the Lehigh Valley Coal Co.'s Prospect mine.

The Prospect mine pumps have to operate constantly to keep underground water from flowing into nearby active mines which employ about 2,600 men and have an estimated 10 million tons of coal reserves.

Imperial Coal Co., Denver, Colo., has been awarded a $177,600 contract by the U.S. General Services Administration to supply coal to Federal agencies in Denver.

Consolidation Coal Co., Pittsburgh, reports a total net income of $3,542,941 for the quarter ended Sept. 30, equal to 38c per share compared with $6,052,-260 or 66c a share for the September quarter of 1957.

Consolidated net income for the 9 mo ended Sept. 30 amounted to $10,683,-143 or $1.16 per share as against $19,-169,799 or $2.08 per share for the same period of 1957.

Eccles No. 6 mine near Beckley, W. Va., reopened after being closed 10 mo to permit construction of a new preparation plant.

The mine employs approximately 150 men.

The new plant will operate on a one-shift basis, cleaning coal from two-shift operation of the mine. Annual capacity is about 350,000 tons.

Spring Canyon coal mine, Carbon County, Colo., has been closed on order of new owners, who recently bought the mine.

The mine, which has operated almost continuously since 1916, was shut down in April because of lack of coal orders. The final closure order reportedly was attributed to the new owner's feeling

that production cost was so high that it prohibited further operation.

Idled since May, approximately 325 workers have been called back to work at Dorrance Colliery of Lehigh Valley Industries.

As to how long the men will work, nothing definite has been decided since business conditions are the deciding factor. At peak production, Dorrance employs approximately 1,000 men.

The total net profit of Island Creek Coal Co. and its subsidiaries for the first 9 mo of 1958 is $2,852,481 compared with $6,931,431 during the same period in 1957.

The consolidated net profit for the third quarter of 1958 is $996,587 against $1,946,421 for the same quarter of 1957. Third quarter per share earnings are $0.44. Per share earnings for the third quarter last year were $0.88.

Coal production in the first 9 mo of 1958 totaled 7,419,630 tons against 10,625,109 for the same period last year.

Hudson Coal Co. had a net income of $54,651 on sales revenues of $1,614,440 during September.

In September of 1957 the company suffered a net loss of $77,043. Net loss for the first 9 mo of this year totals $826,403.

Accidents

Latest estimates at the Cumberland mine No. 2 at Springhill, Nova Scotia, place the number of dead at 93.

At press time, 20 bodies had been recovered and hope abandoned for the 77 still trapped in the mine's depths.

A total of 166 men were working in the mine when the "bump", or bursting of the coal seam, occurred Oct. 23. In addition to the tons of rock and coal that choked the passageways, the bump unloosed pockets of gas, which severely hampered rescue efforts.

Twenty-two miners were killed in an explosion in the Pocahontas Fuel Co.'s Bishop mine near Bishop, W. Va., Oct. 27.

At the time of the explosion, 188 men were in the mine. The 166 survivors were able to make their way out. Company officials said the mine would be closed indefinitely.

Thirty-seven men were killed in the same mine early last year.

Health

Plans have been made to X-ray more than 55,000 Pennsylvania coal miners in a drive against miner's asthma.

The State Health Dept., in cooperation with the Mines Dept., started on the program as part of the first active silicosis prevention program sponsored by the state since 1939.

Department experts, accompanied by

Bituminous Output

YEAR TO DATE	PRODUCTION
Oct. 18, 1958	310,565,000
Oct. 19, 1957	399,319,000

1958 output 22.2% behind 1957.
A month earlier output was 22.7% behind 1957.

WEEK ENDING	PRODUCTION
Oct. 18, 1958	8,530,000
Oct. 19, 1957	9,862,000

Anthracite Output

YEAR TO DATE	PRODUCTION
Oct. 18, 1958	17,153,000
Oct. 19, 1957	20,800,000

1958 output 17.5% behind 1957.
A month earlier output was 18.8% behind 1957.

WEEK ENDING	PRODUCTION
Oct. 18, 1958	472,000
Oct. 19, 1957	519,000

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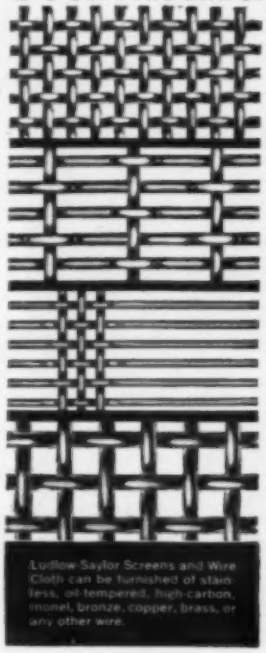

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This typical attention to quality is why Star and L-S Screens and Cloth are best for every sizing, straining, filtering operation. They have better dimensional stability, resistance to wear, pressure, vibration, heat. Insist on Star or L-S Screens and Cloth—they cost not one cent more.

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Now made especially for underground use where fire-resistance and flame-retardancy are musts, Quaker belting meets U.S. Bureau of Mines Designation U.S.B.M. 28-11 . . . in fact, far exceeds the standards set for it. For example, test flame was extinguished immediately, and afterglow disappeared in one-third the permitted time.

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QUAKER RUBBER DIVISION

Health *(Continued)*

state mine inspectors have started a mine-by-mine inspection of dust conditions.

According to Dr. Jan Lieben, Industrial Hygiene Div. director, the occurence of silicosis and related chest diseases are directly proportional to the amount and quality of dust in the coal mines.

Safety

West Virginia's coal-mine safety record improved but was offset by a more than 30-million-ton drop in production during the first 8 mo of 1958, compared to the same period last year.

According to the states Mines Dept., there were 72 fatal accidents this year through the end of August compared with 130 for the same period last year.

First 8 mo production this year totaled to 70,682,220 tons against 100,953,212 tons for the first 8 mo of 1957.

The West Virginia First Aid State Championship was taken by the team representing the Clinchfield Coal Corp., Compass Mine No. 1, Clarksburg, W. Va. and the Central W. Va. Coal Mining Institute.

The team from Maust Coal & Coke Co. mine at Marlinton won second place. Third place went to the team representing Semet-Solvay's Harewood Mine No. 1, at Longacre.

The National Coal Association safety trophy went to the Harewood team. Members of the Compass team received NCA individual safety award keys, among other honors.

Mine 21, Bethlehem Mines Corp., McRoberts, Ky., and Turner Elkhorn Mining Co., Drift, Ky., won top awards in the Pikeville (Ky.) Safety Day Contest.

Mine 21 won first place in the mine-rescue contest and Turner Elkhorn took first place in the first-aid contest.

Transportation

The Kentucky State Railroad Commission has lifted its order holding back a freight-rate increase for carriers of fine coal.

The increase, not to exceed 15c per ton, was authorized July 30. It was suspended, however, on Aug. 13, pending further study.

This latest action allows the increase on all intrastate shipment of coal.

Utilization

The first delivery of coal from western Kentucky to a huge new electric gen-

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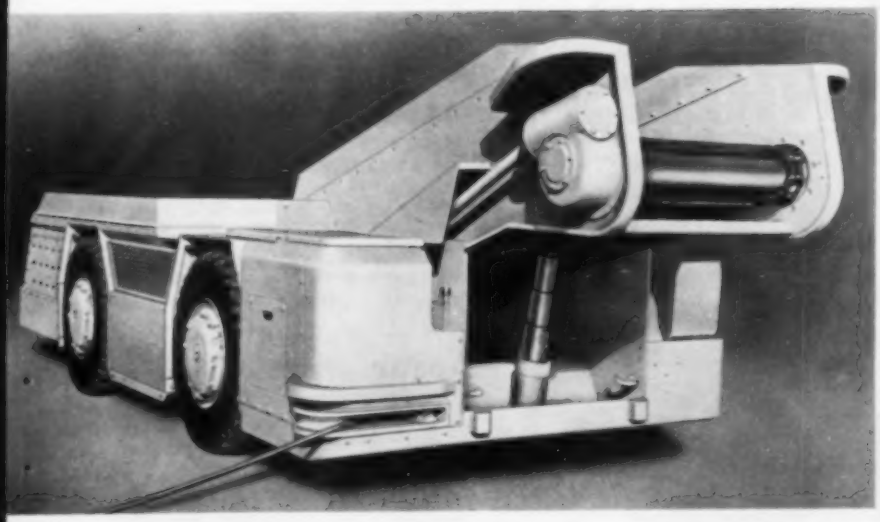
in service than all other makes combined



From first field tests, to sales leadership of the industry in less than six years! This truly remarkable achievement of the AC Torkar is based solidly on superior performance *in the mine* . . . single-motor simplicity, equal high torque traction on every wheel, no-fight steering, outstandingly low maintenance. Choose AC or DC drives, in Types 26, 30, 36 and 48 according to your conditions—make TORKAR your one-word shuttle car specification!

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YOU SHOULD KNOW these great U. S. Royals have moved *millions* of tons with *no* downtime due to tire failure. Yet they cost no more. Write J. A. Watson, Mgr., Industrial Tires *now!*
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EMERALD MINE TEAM NO. 2, Emerald Coal & Coke Co., Clarksville, Pa., won first place in the Pennsylvania State Bituminous First Aid Meet. Team members and company officials shown are: left to right, kneeling, Thomas Murphy; Elmer Speelman; Edward Collage. Standing: Eugene Downer, safety director; V. D. Whipp, assistant superintendent; Steve Sabo Jr.; Porter Remington, captain; E. J. Evans, superintendent; James Cirota; and Earl Alexander.

Utilization *(Continued)*

erating station at Memphis, Tenn., has been made.

Officials from three companies said they eventually would supply the plant with a million tons of coal annually. The three companies participating are West Kentucky Coal Co., Pittsburgh & Midway Coal Mining Co. and Peabody Coal Co.

Labor

The U.S. District Court at Scranton, Pa., has permanently enjoined Mary Bernardi of Bernardi Coal Co., Wyoming, Pa., and John Musto, manager of the company, from further violations of federal wage-hour laws.

James P. Mitchell, Secretary of Labor, was plaintiff in a consent decree against the firm, which is engaged in the production of coal for interstate commerce.

The company did not contest charges that it neglected to pay time and a half for work in excess of 40 hr per week, as required by federal law, and that it failed to keep proper records of wages and hours.

Computations indicated the firm owes about $2,100 in back wages to 26 employees.

Associations

J. E. Tobey Jr., has been elected secretary and manager of the Mid-West Coal Producers Institute, Chicago.

He succeeds A. J. Christiansen, who has resigned but will continue in a consulting capacity in addition to his duties as secretary of the Northern Illinois Coal Trade Association.

The institute also has established a traffic and conservation department. The traffic department is headed by Charles W. Stadell, who was named commerce director, and by Walter L. Pedigo, transportation director. L. E. Sawyer is director of conservation.

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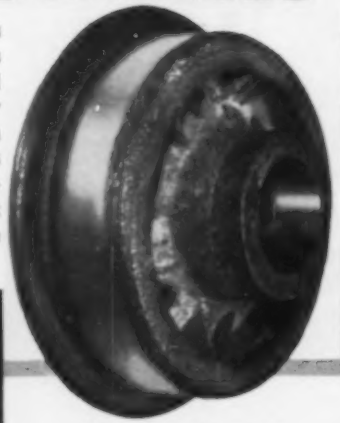

Cross Section of acf "Load Support" Mine Car Wheel showing: (1) uniform depth of hardening, (2) extra heavy overhang, (3) support at center of tread.
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New Books

Coal As a Raw Material

The Metallurgical, Chemical and Other Process Uses of Coal, by R. A. Glenn and H. J. Rose. This publication shows the versatility, present importance and future potentials of coal as an industrial raw material. It contains information not readily available on all coal-using processes which are in commercial use or which have been developed to the demonstration plant stage. Nine tables show for each process the following: (a) the typical yields or unit requirements of fuel and power; (b) the typical end products and their uses; and (c) the present and estimated future tonnage requirements of coal and coke. For this survey, 4,000 recent technical articles were examined. Of these, about 400 selected references are cited for those who may want more detailed information. *64 pp. 8½x11-in; cloth. $3, Bituminous Coal Research, Inc., 121 Meyran Ave., Pittsburgh 13.*

Mining History in Art

Mining in Art (Der Bergbau in der Kunst), by von Heinrich Winkelmann, S. Lauffer, C. Beutler, W. Holzhausen, E. Kollmann, Hanss-Ulrich Haedeke and E. Trier. A comprehensive international collection and interpretation of mining in the arts from bronze age to the present time. The reproductions have been chosen from a collection of 1,000 pictures, and include 62 color reproductions and 330 black and white. Text is in German. *480 pp. 9½x11½-in; cloth. DM98 (about $23), Verlag Gluckauf, Huyssenallee 105, Essen, Germany.*

Welding

Specification for Mild Steel Arc Welding Electrodes describes the latest changes in specifications for mild-steel electrodes. Among the major changes are three new iron-powder electrodes; new E70 mild-steel classification; listing of some eceltrodes in both E70 and E60 series; and a new chemical requirement for certain electrodes. *50¢, Technical Dept., American Welding Society, 33 W. 39th St., New York 18, N. Y.*

Mine Fire-Fighting Methods

Fire-Fighting System, Allen Coal Mine, Colorado Fuel & Iron Corporation, Stonewall (P.O. Weston), Las Animas County, Colo., by P. C. van Natter describes the fire-protection system at Allen mine, including details on water supply, surface and underground equipment, rockdusting machines, location and types of fire extinguishers and safety measures provided for belt conveyors. The report also tells of the fire-fighting organization and procedures used to insure proper care of fire-fighting equipment. *I. C. 7852, Publications-Distribution Section,*

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Most storage bins look good on the outside, BUT...

1. Have they been built to meet the required method of loading?
2. Is the storage area and inside wall built to favor the characteristics of the material to be stored?
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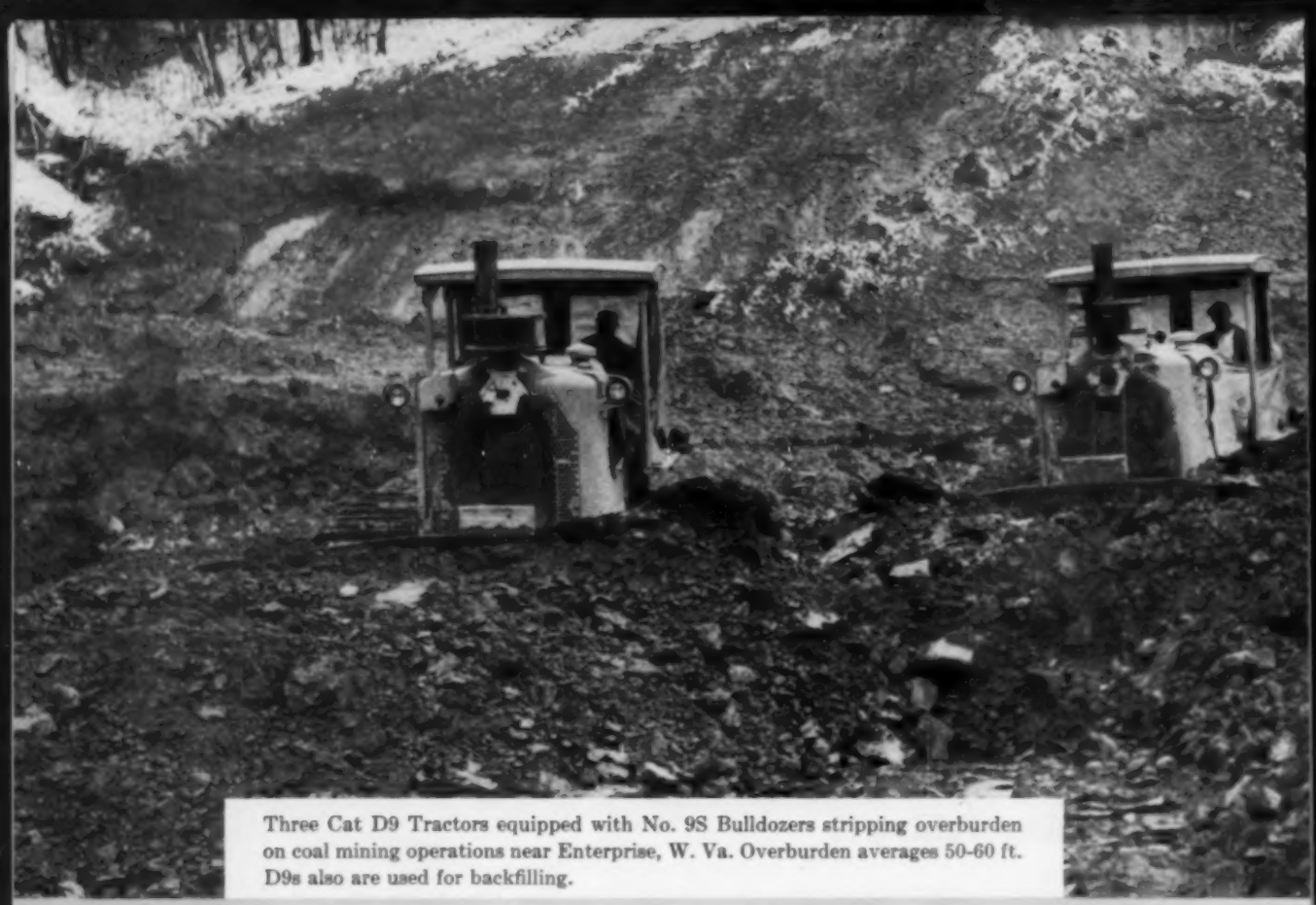

Three Cat D9 Tractors equipped with No. 9S Bulldozers stripping overburden on coal mining operations near Enterprise, W. Va. Overburden averages 50-60 ft. D9s also are used for backfilling.

Three D9s stepped up profits in

Profit in a strip mining operation depends on low-cost, high-production earthmoving. That's why you see more and more Caterpillar D9 Tractors at work in successful strip mines. This "King of the Crawlers" is a top producer, day in and day out, even under the most difficult conditions.

Three D9s set the pace for United Coals, Inc., of Enterprise, W. Va., rounding out a 100 per cent Caterpillar team that includes a D8, a No. 977 Traxcavator and three Cat wheel Tractors with Athey wagons.

Lawrence A. Costelac, United's secretary and treasurer, says, "We used to have three different makes of machines. But we went to the exclusive use of Caterpillar equipment because it proved more dependable, more productive and better from a mechanical and service standpoint.

"We purchased three D9s when we realized the tough conditions and tremendous yardage to be moved in our present operation. We're getting the performance we expected—and then some!"

Your Caterpillar Dealer has a complete line of crawlers, ranging up to the mighty D9. Call him today for a demonstration on your job. Just tell him when you want the equipment there.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

this West Virginia mining operation!

Balance, flotation and ease of operation are big features of the D9, says Lawrence A. Costelac, secretary and treasurer of United Coals, Inc. "I like Cat-built Tractors —they just keep on running." On many strip mining operations, a D9 equipped with ripper breaks up the seams of coal.

HERE'S WHY THE D9 IS BEST FOR STRIP MINING

* 320 HP at flywheel.
* 30-ton weight.
* Exclusive Caterpillar oil clutch—plates cooled and lubricated with oil, rarely need adjustment.
* Optional torque converter transmission.
* Heavy-duty steering clutches with finger-tip steering. Power-boosted controls.
* Extra-rugged frame and final drive.
* Massive 7-roller track frame.
* Full line of attachments.

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FOR MINING'S TOUGHEST JOBS

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PROFIT
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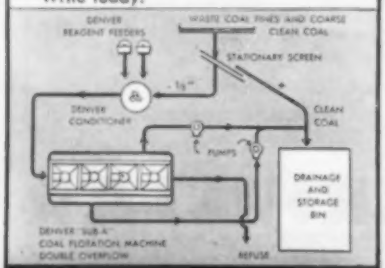
Simple...Low Cost!

You can handle coarse coal (—½"x0") at the head of your circuit in DENVER "Sub-A" Flotation Machine. You save coarse as well as fines in a coal product which is easily dewatered! You have simple, low-cost system.

Over 90% of all coal flotation plants in U. S. are Denver "Sub-A", an outstanding testimonial to DECO's experience, engineering "know-how" and equipment.

DECO can provide complete testing, engineering service, flow-sheet design and all equipment for your coal flotation plant. One source of supply, one responsibility. Write today!



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New Books (*Continued*)

Bureau of Mines, 4800 Forbes Ave., Pittsburgh 13, Pa.

Studies With High-Expansion Foams for Controlling Experimental Coal Mine Fires—A Progress Report, by Dr. Irving Hartman, John Nagy, R. W. Barnes and E. M. Murphy. This report discusses laboratory studies of 35 foaming agents and 20 additives and gives results of more than 70 foam-generating tests in addition to nine actual fire tests at the Bureau's experimental mine. The Bureau's conclusion is that fires of moderate size and intensity can be controlled effectively by large masses of foam generated several hundred feet away. *R. I. 5419, Publications-Distribution Section, Bureau of Mines, 4800 Forbes Ave., Pittsburgh 13, Pa.*

Accident Prevention

Handbook of Accident Prevention, second edition, is written for small businesses lacking full-time safety specialists and has been updated with information on radioactive hazards and ways to protect against them. *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

Preparation

Operating Results with the Feldspar Fine-Coal Jig, by M. R. Geer and H. F. Yancey describes laboratory- and commercial-scale tests of the feldspar jig. Trials indicate that the feldspar jig could be employed advantageously in some coal-cleaning plants in the United States. *R. I. 5412, Publications-Distribution Section, Bureau of Mines, 4800 Forbes Ave., Pittsburgh 13, Pa.*

Equipment Approvals

Four approvals were issued during September.

Lee-Norse Co.—Model LCM28-2K/M miner; two motors, each 50-hp, 250/550 volts, DC. Approvals 2-1399 and 2-1399A. Sept. 15.

Jeffrey Mfg. Co.—Model MT66 shuttle car; two motors 23-hp each, one motor 20-hp, 440 volts, AC. Approval 2-1400A. Sept. 29.

Joy Mfg. Co.—Type CD43 drilling machine; one motor, 26-hp, 220/440 volts, AC. Approvals 2-1401 and 2-1401A. Sept. 30.

Plymouth Locomotive Works—Model FMD—24; 5 to 7-ton diesel locomotive, 18 to 56½-in track gages, for use in non-coal mines. Approval 2419. Sept. 5.

Thirty-six
STURDILITE
HEAVY DUTY
FLOOD LAMPS
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Whether it's this colossal Marion shovel with a 70 cu. yard bite, or medium size or small machines, STURDILITES are providing better light, longer lamp life, at lower cost, for users of all types of mobile mining and construction equipment.

STURDILITES are recognized the world over as standard equipment where vibration, shock and generally rough treatment present lighting problems.

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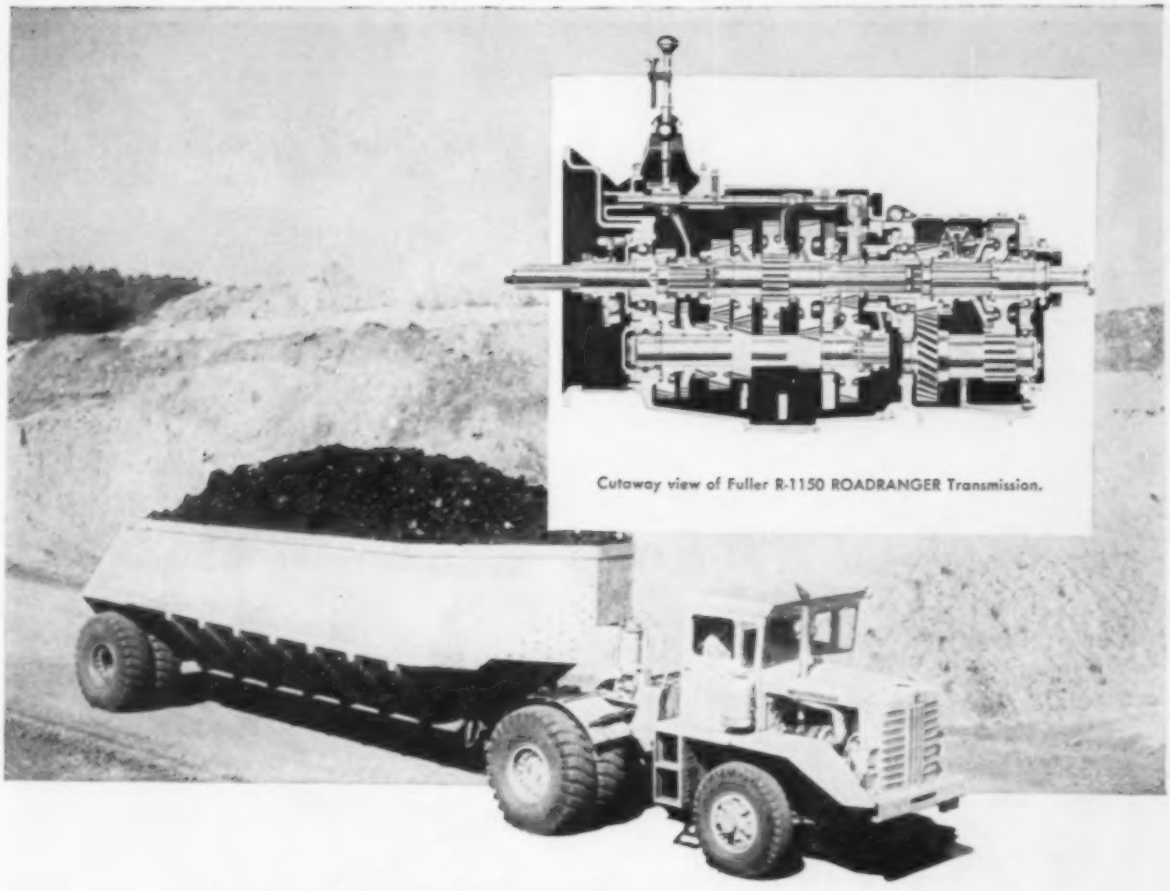


Cutaway view of Fuller R-1150 ROADRANGER Transmission.

Geared by FULLER... New International Coal Hauler hustles 56-ton pay loads

This giant-sized International Bottom Dump Coal Hauler handles heaped pay loads up to 79 cubic yards at speeds to 38 mph. This takes brute power . . . and rugged components to keep the loads moving under fast work cycle schedules.

This is why the new 335-hp International 95 Bottom Dump Coal Hauler is offered with a 9-speed, semi-automatic Fuller R-1150 ROADRANGER® Transmission. Designed and built for this heavy-duty service, the R-1150 ROADRANGER offers these important advantages:

- **No gear splitting—9 selective gear ratios are evenly and progressively spaced.**
- **Easier, quicker shifts—38% steps between ratios.**
- **One shift lever controls all 9 forward and 1 reverse speeds.**
- **Engines operate in peak hp range with greater fuel economy.**
- **Less operator fatigue—1/3 less shifting.**
- **Range shifts pre-selected—automatic and synchronized.**

Faster work cycles, lower fuel consumption, longer engine life, bigger profits—these are the important advantages of specifying rugged ROADRANGERS in your new off-highway equipment.

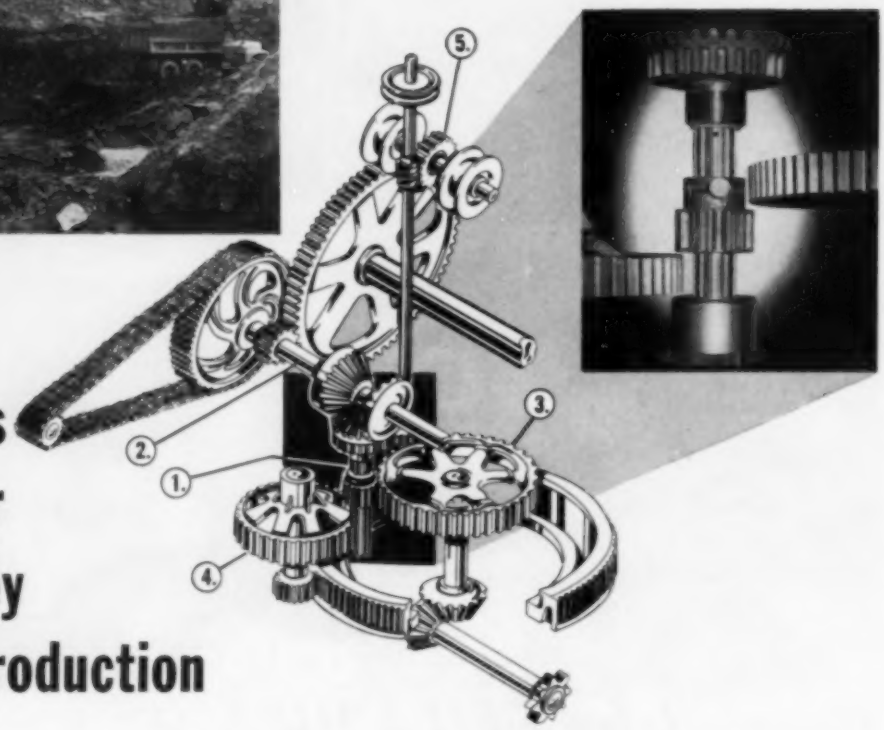
FULLER

TRANSMISSIONS

FULLER MANUFACTURING CO. Transmission Division • Kalamazoo, Mich. Subsidiary, Eaton Manufacturing Company

Dolt Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest. Dist. Office, Tulsa 3, Okla.

This 2-yd. Manitowoc High Lift Shovel loads out 150 tons of coal per hour for Teramana Brothers of Steubenville, Ohio. One of the most important factors contributing to the company's production increase is the Manitowoc "Power-flo" drive described below.



The key to Manitowoc's extra power is the key to top production

. . . and that extra power is provided through the *exclusive* Manitowoc "Power-flo" slide pinion arrangement that directs the full flow of engine power *only* to the function in operation. There are no power-robbing extra gears moving, even when not in operation (and gears that don't move don't wear out) . . . no complicated trains of gears that hold production down and keep maintenance costs up.

What arrangement could be simpler? As shown in the photograph above, the slide pinion itself is a single, sturdy shaft, spline-fitted with the necessary gears to engage, or disengage the desired function. The slide pinion (No. 1 on the drawing) is driven directly from the drive shaft (2) using only one set of clutches to drive the travel, swing and boom hoist.

With the slide pinion up, the power flows directly from the reversing clutches to the travel gear (3) through the center pin and to the horizontal shaft in the carbody.

With the slide pinion down, the power flows directly to the swing shaft (4) containing the final drive pinion, which meshes with the carbody ring gear.

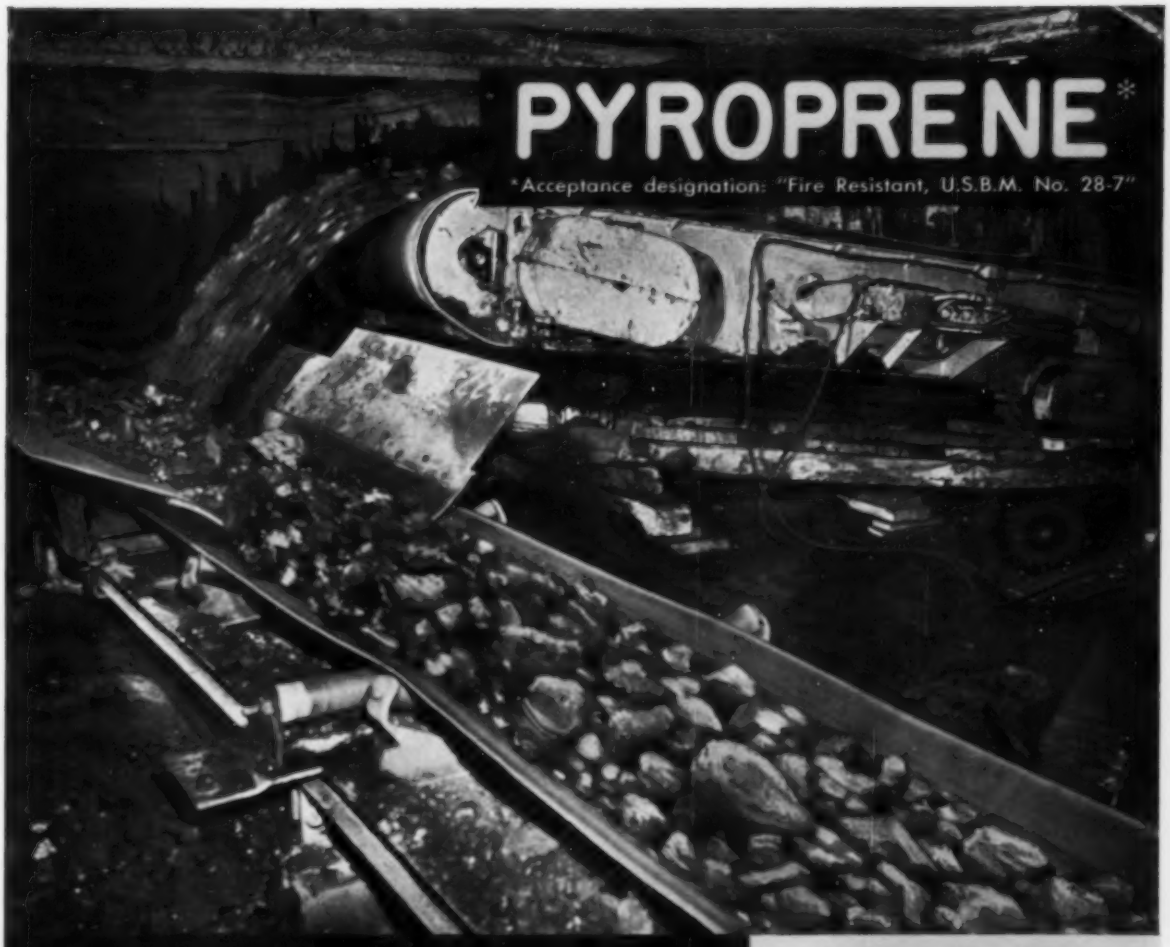
With the slide pinion in neutral, the reversing clutch is left free to operate the boom hoist (5) if an optional independent boom hoist is not used.

The result is *direct* power to every function . . . a feature found in *Manitowoc* cranes, draglines and shovels. The faster cycle, heavier lifts and bigger bites found in Manitowocs are the direct result of this simple and effective "Power-flo" design. That's why output is *measurably* higher with Manitowoc . . . that's why it will pay you to see your Manitowoc dealer for complete information on the rig best suited to your operation.

Manitowoc

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN

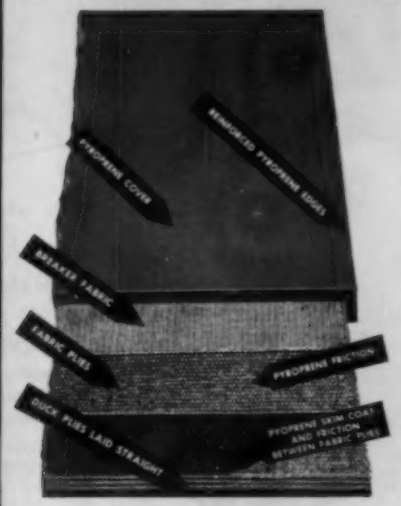
CRANES	SHOVELS	DRAGLINES	TRENCH HOES
20 TON - 100 TON	1-YD. - 3½-YD.	1-YD. - 6-YD.	1-YD. - 2½-YD.



Ten ways a Pyroprene belt will increase safety and service

A conveyor belt's resistance to fire is of prime importance—but important, too, is its ability to outlast severe service conditions, haul maximum tonnage with no time lost for repairs and replacements. Pyroprene belting has this ability to convey more coal at less cost because it is built to combat mine service hazards.

1. Pyroprene belting resists fire
2. Will not support combustion
3. Not affected by oil or grease
4. Withstands crushing impacts
5. Repels moisture
6. Resists mildew
7. Resists abrasion
8. Resists cutting
9. Resists ripping
10. Resists gouging



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DIRECTORS AND STAFF of Bituminous Coal Institute planning the BCI program for the fiscal year that began Oct. 1 are: back row, left to right, George S. Lockwood, Jr. representing Henri Pell Junod, Pickands Mather & Co.; B. R. Gebhart, vice-president, Freeman Mining Corp.; Carroll F. Hardy, managing director, BCI; Tom Pickett, vice-president, BCI; George E. Enos, president, Enos Coal Mining Co., and treasurer, BCI; Robert W. Bidlack, Citizens Fuel & Supply Co.; and Tom Howarth, BCI secretary and assistant treasurer. Seated; Harold D. Wright, board chairman, Republic Coal & Coke Co.; F. Stillman Elfred, board chairman, Peabody Coal Co.; R. L. Ireland, BCI president, and executive committee chairman, Consolidation Coal Co.; M. L. Patton, BCI executive vice-president, and Traux-Traer Coal Co. executive vice-president; George E. Owen, president, Imperial Coal Corp.; and W. S. Webster, vice-president and general manager, Walter Bledsoe & Co.

Preparation Facilities

Wisconsin Steel Coal Mines, Benham, Ky. – Purchased from Diester Concentrator Co., Inc., four Concenco "77" Diagonal-Deck coal washing tables with twin decks to handle ¼x0 fraction.

Central Appalachian Coal Co., Morr's Creek Mine, Montgomery, W. Va.– Contract closed with Eimco Corp. for one 6-ft diameter x 3-disc Agidisc filter complete with auxiliaries to dewater approximately 3 tph of fine, clean coal solids as froth from flotation cells.

Chapel Coal Co., Kingwood, W. Va.– Contract closed with Irvin-McKelvy Co. for cleaning plant to process 250 tph, including R&S air tables, Williams & Green screens and mechanical slate ejector, Neff & Fry concrete silos for 2,000 tons storage, and Jeffrey feeders.

Zacherl Coal Co., Inc., Lucinda, Pa. –Contract closed with Irvin-McKelvy Co. for additional storage bins for r-o-m coal and cleaned coal, including Syntron feeders, belt conveyors, and flight conveyors. Completion, Oct. 31, 1958.

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"Top-Tite's" GOT IT!
Here's what bolting people have been looking for!
A STEEL SHELL that leads the way in...
HOLDING POWER—TIGHTENING SPEED
—RELIABILITY
"TOP-TITE" has fine grooves instead of saw teeth for better, more even distribution of the bolt load. And the jumbo-sized plug makes sure the broad leaves stay against the hole wall... no leaf curl-in. And for speed of tightening—just ask a crew that's switched to "TOP-TITE".
Have you had trouble with plug pull-out... leaf breakage... misalignment? Instead of merely lessening these problems, "TOP-TITE" eliminates them. Call or write us today!
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"Less maintenance problems with BUCYRUS-ERIES... less downtime, more pay hours for me!"

—says 22-B operator at Iowa mine

"I've had experience with Bucyrus-Eries and several other makes," says Wayne Zeck, Knoxville, Iowa, who operates a 22-B coal loading shovel for Beard Coal Company. "I've found that you have far less maintenance problems with Bucyrus-Eries. That means less downtime and more pay hours for me."

MORE OUTPUT, too,

for Owner, Byron Beard

"Bucyrus-Eries prove as good as you expect them to," states the veteran strip miner whose Flagler mine has been in operation since 1934. His 22-B, equipped with 1⅛-cu. yd. coal loading dipper, loads coal during an 8½-hr. shift. "Engineering-wise, this 22-B is a swell machine. I like the machinery layout, and I especially like the power system for its long life with little maintenance!"

You can enjoy the same low upkeep, high output pit operation. With a Bucyrus-Erie 22-B shovel, you get more working time each hour of every shift — more daily output — because:

It stays on the job. It's built tough. Quality materials provide strength, durability, all-weather stamina. Parts are simple, large, few in number — there is little that can go wrong. Machinery is arranged simply, compactly so that maintenance can be handled quickly with little downtime. It's easy to keep a Bucyrus-Erie going at top speed. Exceptional synchronization of speeds and power assures smooth, well balanced work cycles . . . fast, responsive controls.

Stop in and chat with your nearby Bucyrus-Erie distributor. He'll gladly give you the complete story on the popular 22-B, or any other model — ranging from ⅜ to 4 cubic yards.

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Plastic Reinforced Primacord Branch Line, recommended for extremely deep holes — also river crossings and other wet conditions. Covered with a tough plastic material — waterproof and resistant to acids commonly encountered. Tensile strength 275 lbs. 1000-ft. spool weighs 22 lbs.

Don't Worry... use Primacord

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When your blast is loaded and hooked up, it cannot be set off by normal vibration or friction, ordinary impact or sparks, *or stray electrical currents.* Even a direct hit by lightning failed to detonate it. Primacord must be detonated with fuse and cap or electric blasting cap.

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Reinforced Primacord Trunk Line — also recommended for deep holes where normal strength and resistance to abrasion and cutting are needed. Textile reinforced (yellow with red thread), tough, resilient, flexible. Tensile strength 160 lbs. 1000-ft. spool weighs 19 lbs.

P-b

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

COAL AGE

NOVEMBER, 1958

IVAN A. GIVEN, EDITOR

Costs and Competition

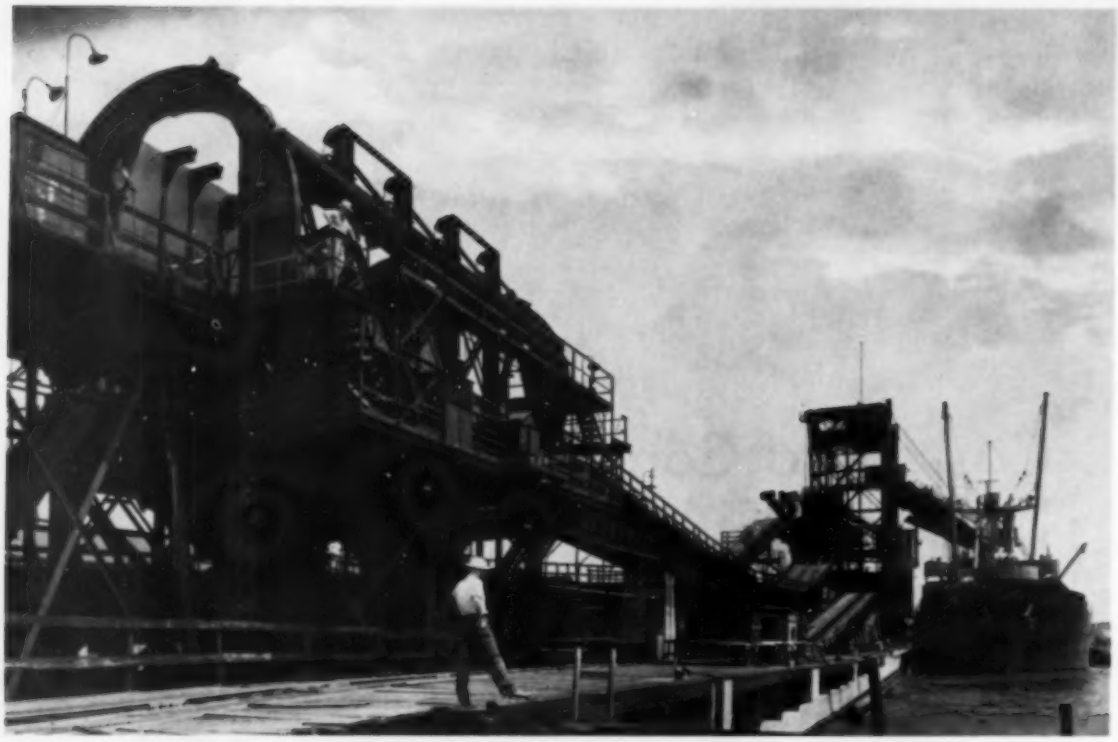
If the recent depression is, in fact, at an end, it definitely has not conformed in many respects to the classical pattern. As an example there has been a steady drumfire of wage increases in key industries. These increases naturally have been followed by price increases—all this in a period of decreased demand by the consumer.

Coal is one of the fortunate few industries that have been able to avoid, in recent years, permanent upward adjustments in prices following wage and other cost hikes. The method has been a mixture of price increases and absorption, with some rare exceptions, until continued investment in facilities to increase production became effective. Fundamentally, this is why the average value of bituminous coal at the mine has remained stable for nearly 10 years.

The big reason for concern with price stability is maintenance or—preferably—improvement of the industry's competitive position. But there are side questions—for instance, the effect of cost increases on the corporate makeup of the industry. Will there be any small operators—or any medium sized ones, also—in the future, and if they disappear what does this mean to industry policy? Whatever may be said pro or con, the smaller producers have saved the industry's bacon on several occasions because they had the flexibility to meet sudden surges in demand. If the role of the small producers is reduced to one of insignificance, what can coal offer as a substitute?

The competitive picture, however, continues to be the big factor. Heavy fuel oil in the New York Harbor is now selling for less than the coal equivalent. If the reductions spread and are continued any length of time coal is in for real trouble. And natural gas, as a result of large Canadian discoveries, may gain a new lease on life.

To point out problems is not to concede that coal's opportunity is necessarily any less in the future. It will only be harder to realize. Coal's big weapon will remain investments of both money and brains in methods and facilities to continue to raise efficiency and quality. Even if competition gets no keener, this remains the vital consideration. If competition picks up more power, such investment will become doubly vital—and will require, in addition, the utmost in public-relations, government-relations, merchandising and research efforts.



ABNORMALLY LOW ocean freight costs now favor sales of U. S. coal overseas. Question: When these costs start moving back up—as no doubt they eventually will—is the trade anticipating stiffer competition from Poland and the U. S. S. R.?

High Exports Still Firm

Annual overseas shipments are leveling off to the 35- to 40-million ton range, or more than double the pre-1955 volume. Although this range is a near-sure bet for 5-yr planning, the possibility of temporary dips below or spurts beyond range limits cannot be ruled out.

By **W. A. Raleigh Jr.**, Associate Editor and **Overseas Correspondents**
Coal Age

WHAT'S AHEAD FOR U. S. COAL EXPORTS? Is the market still permanent? How do you explain the 20-million ton drop in coal shipments this year? What about West Germany's September ban on imports? Are others likely to follow?

To get the answers to these and other related questions, *Coal Age* asked its overseas correspondents for a rundown on the coal-import situation in the five major European-importing countries—West Germany, Netherlands, Belgium, France and Italy—which currently buy about 85% of all U. S. coal sold to Europe and account for some 73% of total U. S. overseas coal trade.

Coal Age also polled its correspondents for a rundown on the coal-export outlook in Poland, Great Britain, West Germany and the U. S. S. R.—the four major countries competing with the U. S. to supply the world's coal needs.

Answers, based on interviews with government and trade officials, add up as follows:

1. The main factors supporting the permanency of high-level overseas trade have not changed. Neither local production of importing countries nor exportable surpluses of traditional European suppliers are adequate in quantity or quality to meet long-range needs for West Europe's industrial growth.

2. Between now and 1965, the total permanent overseas market for U. S. coal should level off to the 35- to 40-million net-ton range predicted by *Coal Age* (March, 1956, p 54). In 1958, exports will hit an estimated 38 million tons (down from last year's record peak of 58 million tons); in 1959, a drop to 34 million tons is in the cards; by 1960, as current high stockpiles become depleted, a movement back up to 40 million tons is likely. Although 35 to 40 million tons should be the normal range, in any market so historically volatile as exports the possibility of temporary dips below or spurts beyond range limits cannot be ruled out.

Tracking the Market . . .

ANTICIPATING and following major trends in key markets is a continuing *Coal Age* job. Export features, for example, have included:

"U. S. Coal Props World Prosperity," which gave the industry its first authoritative report documenting in detail the factors supporting a long-range, high-level overseas business (March, 1956, p 54).

"Planning for Firm Export," which called for industry action to organize machinery that would assure overseas customers quality coal at the lowest possible price (June, 1956, p 55).

"Are the Railroads Ready for Tomorrow's Exports?" which reported on how the major export carriers were planning to handle future increases in overseas tonnage. Panel discussions drew attention to the need for anticipating the buyer's market, and to the prospect of another coal port opening at Charleston, S. C. (August, 1957, p 54).

"High Exports Still Firm," appearing on these pages, which cuts through the maze of current uncertainties to show why overseas trade will continue to be a bulwark to the industry's total merchandising structure.

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3. Behind the 20-million net-ton drop in exports this year is a combination of factors including excessive European stockpiles caused by overbuying in 1957, a drop in the rate of European industrial growth, increasing competition from oil and gas, and price-cutting by Poland and the U. S. S. R.

4. No other major European importer has indicated any move to follow West Germany's lead in slapping an embargo on coal imports. Note, however, this comment from the Belgian Ministry of Economic Affairs: "The entire Belgian coal position is now under review. No special steps are contemplated against imports from outside the [European Coal and Steel] Community, but we will study the possibility of establishing a common import policy at the Community level."

5. Demand for U. S. metallurgical coal will remain noncompetitive and fairly steady, although at a somewhat reduced level as the rate of industrial growth tapers off in several European countries, notably, West Germany, France and Belgium.

6. The buyer's market has arrived in steam-raising coal. Currently, because of low delivered prices and the wide selection of coals offered, imports from the U. S. get the nod from heavy steam-coal buyers such as Italy and the Netherlands. But when ocean freight costs start moving back up—as no doubt they eventually will—higher delivered prices will intensify competition from European exporting countries, especially Poland and the U. S. S. R.

Country-by-country reports for major importing and exporting countries follow (all figures are in net tons):

Major Importing Countries

West Germany — With pithead stocks exceeding 11 million tons, West Germany is confronted with her most serious coal crisis ever (highest pithead stocks recorded in the past amounted to 8.8 million tons in 1932).

As a result of excessive pithead stocks, the Bonn Government on Sept. 2 announced an embargo on coal imports which prevents the conclusion of new contracts. For the time being, existing agreements will not be affected.

The upshot: About 13.2 million tons of U. S. coal will be imported this year and possibly about 9 to 12 million tons in 1959. (The latter figure is highly inaccurate since checks on delivery dates of import contracts have just recently got under way. The only hard fact known seems to be that German coal importers have committed themselves to buy 44 million tons of U. S. coal during the next 3 yr starting Aug. 31, 1958.)

The German coal industry attributes the present coal crisis to two main factors:

1. Increasing competition from oil whose share of total German energy consumption has increased from 8% in 1954 to 12% in 1957.

2. Erroneous predictions on future power demand—made by both the Coal and Steel Community and the German Government—which led German importers to conclude long-term coal-import agreements. These official forecasts predicted annual industrial growth rates in Germany averaging 2.5 to 3% while actual industrial growth in 1957 amounted to only 0.9% and a similarly small rate of growth is expected in 1958.

Netherlands — Latest available rough estimates show that total bituminous coal imports should reach 6 million tons in 1958 and 6.6 million tons in 1959. In the same years, respectively, U. S. purchases—almost entirely non-metallurgical grades are put at 3.9 million tons and 3.9 million to 4.4 million tons.

Because of a permanent structural deficit in coal needs, the Netherlands will continue to import coal, and mostly from countries outside the European Coal and Steel Community. Production remains static while consumption has decreased only a little. Most types of coal imported—gas coal (slack), coke and anthracite —are difficult to obtain in western Europe.

The present deficit between total coal needs and coal production—about 9.3 million tons—is expected to rise to 9.9 million tons by 1960 and to 13.2 million tons by 1965.

The source of imports depends mainly on transport costs. As ocean transport is now cheap, there is every chance that U. S. imports will continue. Competitors are mainly West Germany, Belgium and Great Britain. U. S. imports are believed largely covered for the near future by long-term contracts.

Stocks are fairly big now but this will only temporarily affect imports. The electricity works are overstocked and, on hand, too, are some 110,000 to 220,000 tons of anthracite bought last year.

Economic conditions seem to be

recovering from a moderate recession and more industrial expansion is in the offing. In fact, further industrialization is the Government's main goal, owing to enormous population growth. The Dutch dollar situation certainly no longer hampers U. S. coal imports.

Wrapping up the coal picture, the Dutch Minister of Economic Affairs announced in September he planned no steps which would lead to drastic curtailment of imported American coal. Furthermore, a substantial pick-up in total imports is anticipated over the long-range future.

Belgium & Luxembourg—Belgium's imports of coal rose from 5.6 million tons in 1957 to an estimated 6.9 million tons this year. All of the increase was due to higher deliveries from ECSC countries which jumped from 2.5 to 4.4 million tons. U. S. tonnage fell from 2.3 to 1.9 million tons.

Belgium is in the throes of a severe coal crisis compounded of numerous factors including price manipulation, excessive buying from the U. S. and Germany, and depressed condition in the local industry. Focal point of the crisis is pithead stocks which have soared from 197,000 tons at year-end 1956 to 6.3 million tons, or 8½ wk supply, as of Aug. 31, 1958. Meantime, of the country's 119 pits actually winding coal, 84 worked below full-time this year.

Extent of the future U. S. market will not become clear until the present crisis is resolved. Sources in nearby Luxembourg say Belgium's plan is to try and cut immediate purchases of U. S. coal to 1 million tons annually.

Long-range, much depends on whether or not the country's new dependence on German coal has become structural. In recent months, Belgian steel interests—where German financial interests are beginning to creep in—have booked large long-term contracts for German coal, apparently mostly coking coal. One report indicates these contracts may involve up to 2.2 million tons a year.

Luxembourg imports annually around 275,000 tons of coal and will never be a serious market for U. S. imports because of local financial tie-ups and high overland transport costs. The country took 40,700 tons of U. S. coal in 1956 and 14,300 tons in 1957, and, in both cases, solely because of the shortage of available supplies from Germany. The big import is coke, 3.3 to 4.2 million tons annually, which comes mainly from Germany with about a sixth of it across frontiers from France, Netherlands and Belgium.

Demand for coal in Luxembourg in 1958 will reach about the levels of 1953-55, i.e., about 308,000 tons and virtually the whole of this will have been supplied by Germany and other ECSC countries. It is only when demand goes above 385,000 tons, as it did in 1952 and 1956, that any material proportion is covered by imports from outside sources, which were almost entirely Great Britain in the former and the U. S. in the latter year.

France—Official estimates calculate imports as follows:

	1958 Millions Tons	1959 Net
Total bituminous imports	8.3	4.5
Bituminous imports from the U.S.	2.3	1.1
Metallurgical bitum. from the U.S.	1.4	1.1

Note: Although contracts call for imports of 1.1 million tons in 1959—all metallurgical bituminous — purchases will probably not exceed 880,000 tons.

France's bituminous deficit in 1958 —some 8.3 million tons—is expected to drop to 4.4 million tons in 1960 and then bounce back to 6.6 million tons by 1965.

One reason why demand for imported bituminous, especially from the U. S., will drop over the coming years: Natural gas from the Lacq deposit near Pau in southwestern France is gradually being piped to all principal industrial centers. Lacq gas will replace bituminous in many industries as it becomes available. For example, Electricite de France, the nationalized power authority, will drop completely out of the market in 1959. Formerly a big consumer of U. S. bituminous, its energy needs will be supplied by Lacq gas and by coal imported from Poland within the framework of the Franco-Polish bilateral trade agreement.

Also in the picture, purchases of coal from ECSC countries will remain high since this coal usually costs less than U. S. coal unless ocean freight rates are very low. Another reason for high-level imports from the ECSC area: The French steel industry owns some German mines.

Stockpiles of bituminous in France are now at a satisfactory level. But other ECSC countries, notably, Belgium and Germany, have large stocks of U. S. coal which were contracted for during peak demand. The French expect some of this coal to make its way to France at low prices.

France still has a serious dollar shortage, but energy imports to keep industry rolling will be among the last to be touched by import restrictions.

In the past 3 yr, annual industrial expansion has been about 10%. Now it is leveling off and will probably drop to 5 to 6% by 1965. As a result, demand for coal and other sources of industrial energy will taper off slightly.

Italy — During the first 8 mo of 1958, Italy imported 5.0 million tons of U. S. bituminous coal. By year's end, the Coal Committee of the Italian Ministry of Industry and Commerce expects that U. S. deliveries will reach 7.7 million tons or 63% of total imports. The remaining suppliers are: Germany 20%, Poland, 7%, Great Britain 3%, others 7%.

Estimates for 1959 see the above percentages fairly constant, setting Italy's total market roughly at 12.7 million tons, including 8.3 million tons of U. S. bituminous.

Of the average total 12.7 million tons which the Coal Committee estimates Italy will require annually through 1965, only 880,000 tons are produced locally. As there is no change in sight owing to the country's extremely poor coal resources, the deficit must be imported.

Competition from other coal-exporting countries depends mainly on price and ocean freight rates which for the past year have been extremely favorable to U. S. bituminous. Dollar availability presents no obstacle. The Italian Coal Committee foresees no change in the total situation at least until the beginning of next year.

More likely to affect immediate future demand is Italy's present stockpile of 1.8 million tons. Fuel oil and a mild winter have cut Italy's

consumption of coal by 18% so far.

Italy must continue to depend on foreign sources for all bituminous coal needs. Most bituminous imports are still consumed by coke plants, gasworks and railways. And, as long as the price is right and ocean freight rates are down, U. S. coal producers can count on Italy as a steady and generous client.

Major Exporting Countries

Poland—As far as officials can see, the Polish export picture, in markets and prices, is dismal. When they look around they see that some of their best customers, like Western Germany, have coal stockpiles. They see that long-term agreements and low ocean freight costs give the U. S. advantages in West European markets. They also face the threat of new competition from the Soviet Union, for example, in sales to Finland.

From now until 1965, officials say Poland could export about 22 million tons of coal annually. But, as things stand, it is unlikely they will be able to sell that much. In 1956, the Poles had a good year, exporting 23 million tons. In 1957, exports dipped to 14.9 million tons and this year the volume should reach 17.8 million tons. The deficit between available export surplus and actual exports is compounded by a fall in prices which cost the country $200 million in 1957.

About 8.1 million tons of exports this year are earmarked for Communist countries, and about 9.5 million tons for Western Europe. Biggest non-Communist purchases are expected to tally as follows: Finland 1.7 million tons; West Germany 1.3 million tons; Denmark 1.2 million tons; and Austria 1.1 million tons. The Poles also sell to Italy, Sweden, France, Pakistan, Egypt and Argentina.

The Poles are keenly interested in expanding trade with Western Europe, chiefly to get exchange for purchases of coal machinery. But tough marketing policies when coal was scarce are ricocheting and they are now finding it difficult to win customers back. One bright spot: They have signed a 5-year set-price agreement with Austria to deliver 2.5 million tons of coal for that country's railroads.

Great Britain—Export hopes are declining due to these crucial factors:

1. The industry's finances are in serious deficit.

2. Home demand tumbled 5.5 million tons last year and it is expected to fall another 8.8 million tons in 1958.

3. The bulk of present stocks (33 million tons) consists of hard-to-sell small coal.

4. Abroad, prices have been undercut and markets are dwindling.

Coal shipments in the first 7 mo of 1958 totaled 2.8 million tons, thereby running at an annual rate of 4.6 million tons, or 40% below 1957's total of 7.7 million tons. High-volume deliveries in the first 7 mo of 1958 ranked as follows (in tons): Irish Republic (595,000), Denmark (590,000), France (325,000), Netherlands (313,000), Belgium (186,000), Channel Islands (152,000), and Argentina (142,000).

Several factors have combined to slice British exports this year. European importers, for example, maintained stocks at a high and, in many cases, growing level. Recently, too, the drop in ocean freight rates has enabled stateside producers to offer coal often at prices significantly below British rates. Variety offered from the U. S. also has been wide, in contrast to Britain's ability to offer, for the most part, only low-quality steam-raising coal. A constant thorn in the side is competition from the Poles whose unorthodox marketing policies put British exporters in the reluctant position of having to sell at a loss to hold business.

In recent, strongly-worded editorial comment, the Financial Times voiced little hope for increased export shipments. Since this verdict was given, two further blows have been struck: (1) The Dublin Gas Co. concluded an agreement with Irish Shipping for the import of 110,000 tons of American Coal; and (2) Argentina signed an agreement with Poland for 2.2 million tons of coal over the next 3½ yr.

West Germany—All governmental and trade authorities shy away from predicting how much coal West Germany will export in 1958 and 1959. However, based on results of the first 6 mo, 1958 coal shipments might amount to about 10 to 14.3 million tons, compared to 26.0 million tons of actual shipments reported in 1957.

Reluctance to make predictions is based on the fact that practically all of West Germany's export trade is with European countries, especially those of the Coal and Steel Community. And most of these normal outlets can hardly be considered good sales prospects at the moment since they suffer from the same factors of high pithead stocks and lessened industrial demand which have depressed West Germany's coal industry (see import status, "West Germany").

U.S.S.R.—Russia now looms as a formidable competitor for U.S. coal export markets.

Figures just released by the Ministry of Foreign Trade show Russia's coal exports exceeded imports last year for the first time. Current exports are about one-fourth those of the U.S. with two-thirds going to the Communist bloc. But 1957 exports jumped an impressive 54.6% over the previous year to a total of 9.7 million tons; of this, 7.4 million went to communist countries and 2.3 million to the West.

At the same time Russia cut its imports from 7.0 million tons in 1956 to 3.7 million in 1957. Since almost all Russian coal imports come from Poland, this also released 3.3 million tons for Poland's own use or export.

No exact figures are available on Russian export intentions during the next 2 yr but it's certain that under economic warfare declared by Khrushchev an increasing share of rapidly mounting Soviet coal production will go for export. Russian coal output totaled 509 million tons in 1957 and official half year figures show it is running at a rate of 539 million this year. State planning goals call for production of 652 million tons by 1960, climbing in the early 1970s to somewhere between 715 million and 770 million tons.

Meanwhile, Russia is reducing her dependency on coal by a switch to more modern fuels. The shift to diesel and electric locomotives alone is expected to save 330 million tons of coal in 1965 according to a recent estimate by the deputy chairman of the Council of Ministers. He said the change to new fuels is being encouraged and coal's share in the nation's fuel balance will fall from its present 67% to 57% in 1965.

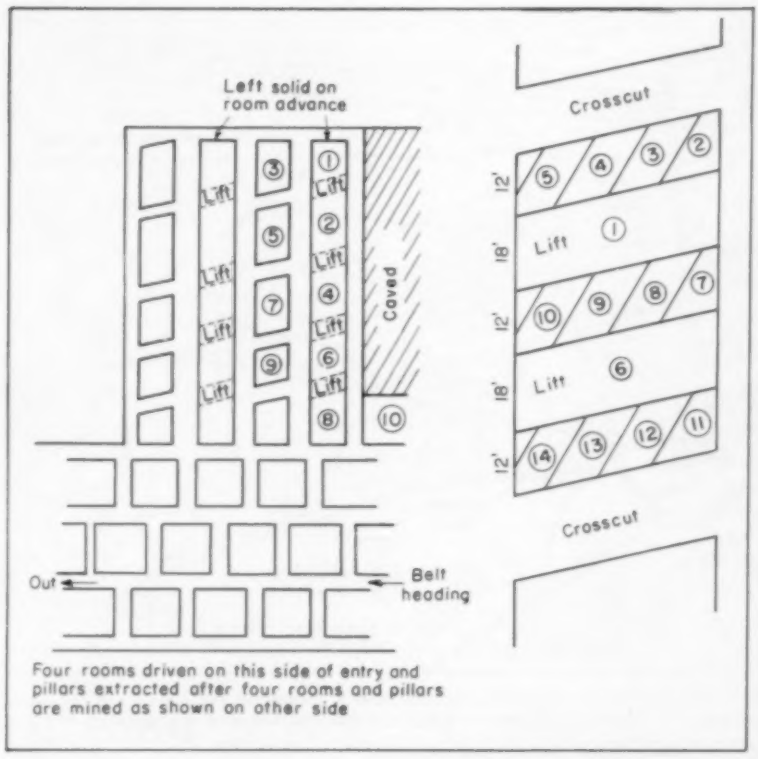
AC CONTINUOUS MINER is latest addition to Allen mine underground equipment. Increased safety, more production and lower maintenance are some of the benefits credited to the application of continuous mining methods.

AC Continuous Mining at CF&I's

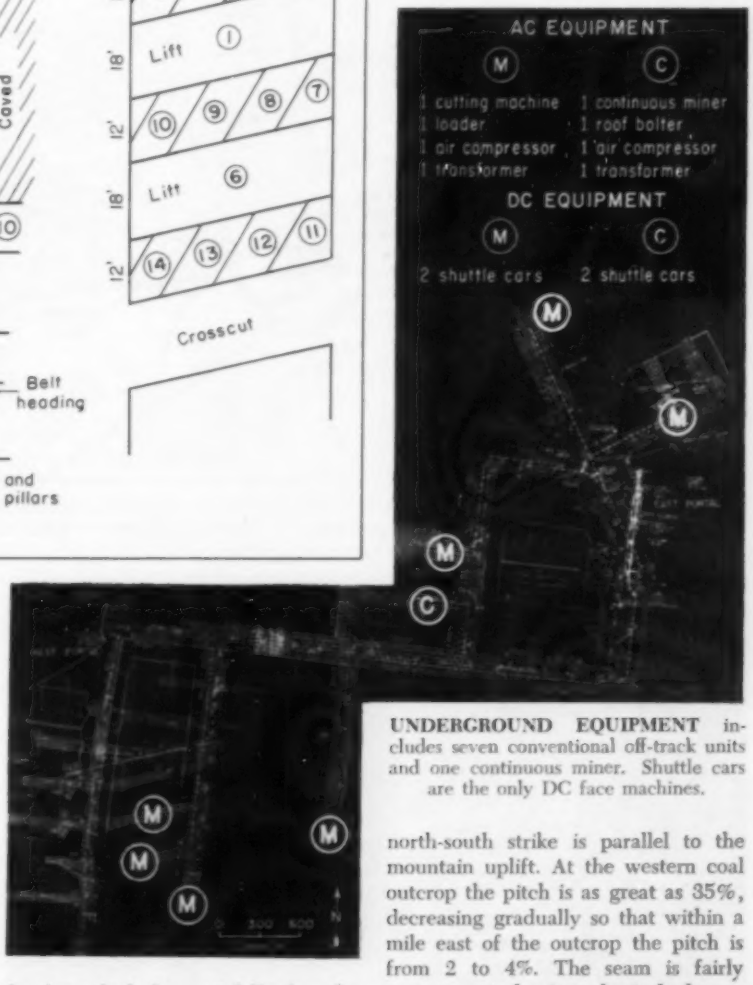
New production records, increased safety are benefits credited to continuous mining. Here's a rundown of mining methods plus details of the power distribution system.

STATIONARY AIR COMPRESSOR located in entry provides compressed air for stopers on twin-arm roof-bolting machine.

ROOF SUPPORT is provided by split-rod and wedge bolts set on 4-ft centers. Steel or wood bars are used with bolts.


Left solid on room advance
Crosscut
Lift
Coved
Out
Belt heading
Crosscut
Four rooms driven on this side of entry and pillars extracted after four rooms and pillars are mined as shown on other side

◄ **PILLAR EXTRACTION** sequence with continuous miner calls for removal of full row of blocks after each pair of rooms is developed. Details of removing individual pillars are shown at right.



UNDERGROUND EQUIPMENT includes seven conventional off-track units and one continuous miner. Shuttle cars are the only DC face machines.

Allen Mine

AC-POWERED mining equipment continues to make gains at Colorado Fuel & Iron Corp.'s Allen mine, Weston, Colo., where an AC continuous miner purchased in February, 1958 is setting new production records. Opened in 1952 as an AC operation, except for shuttle cars and haulage (*Coal Age*, October, 1954, p 83), Allen mine's latest AC addition is the first Lee-Norse CM 37-1E AC continuous miner to go into service in the coal industry. Operating in a room panel since February of this year, the gains resulting from application of the AC continuous miner are:

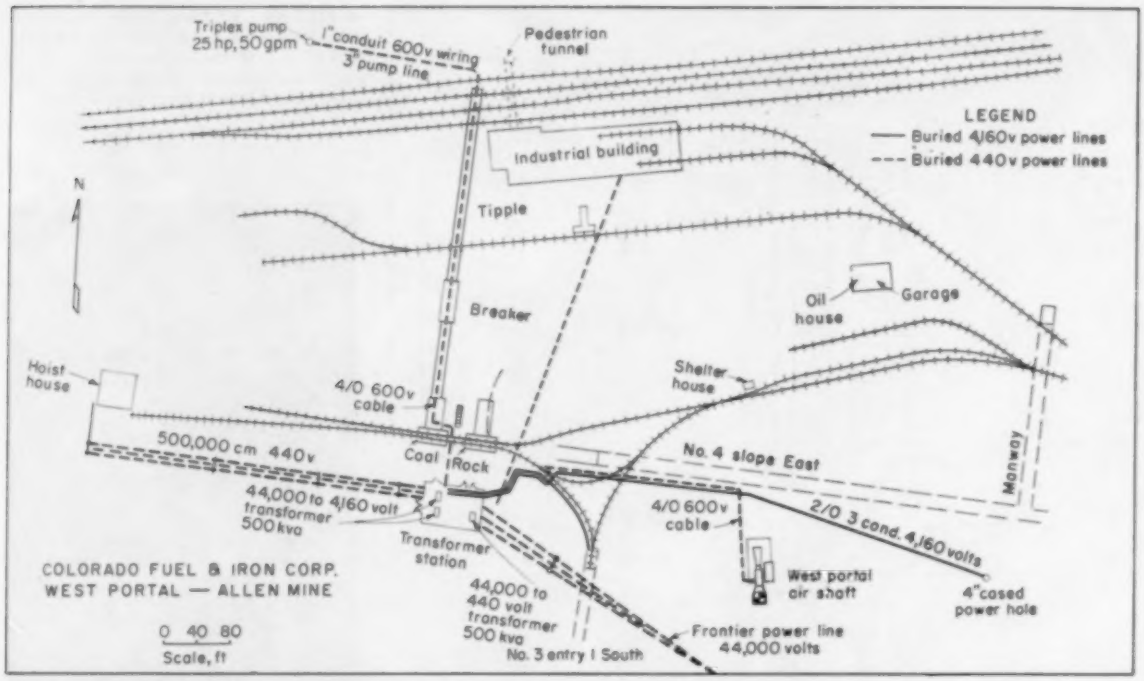
1. More output per face man.
2. Closer supervision.
3. Fewer working places needed per section.
4. Safer, because drilling and blasting are eliminated.
5. Improved roof conditions because strata are not disturbed by blasting.
6. Better face preparation because the draw slack does not fall when the coal seam is being removed by the continuous miner.
7. Low maintenance.

Trouble-free operation of the original AC equipment over the past 5 yr confirmed officials' strong faith in AC underground equipment. Thus, when the company decided to add continuous miners, officials believed that the logical choice would be an AC machine. Results after 6 mo operation confirm their beliefs.

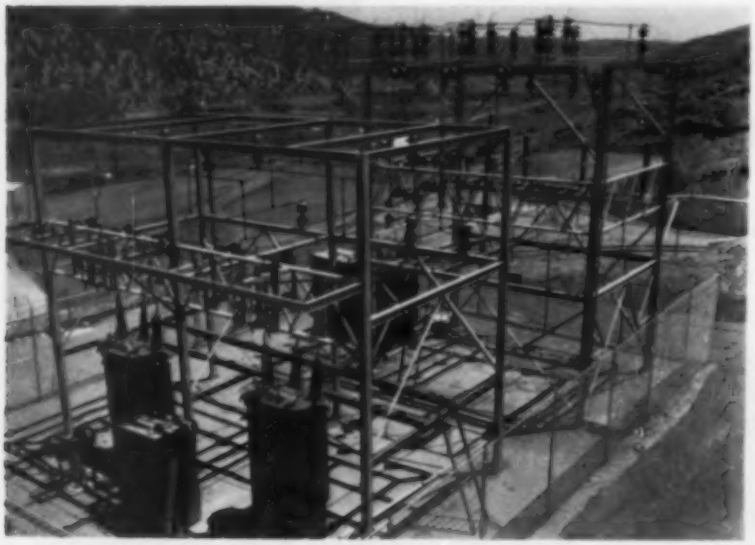
Physical Conditions

The coal seam, called the Allen seam, pitches almost due east and the north-south strike is parallel to the mountain uplift. At the western coal outcrop the pitch is as great as 35%, decreasing gradually so that within a mile east of the outcrop the pitch is from 2 to 4%. The seam is fairly easy to cut, having physical characteristics similar to the Pocahontas coals in West Virginia. There are no sulphur inclusions and the coal in general is free of impurities. Although the floor is a soft shale, the company has experienced only minor difficulty in tramming or maneuvering the 26-ton continuous miner.

The roof is a comparatively weak shale and must be supported with bolts, headers and steel bars. Only split rod wedge-type bolts are used. The company reports that it is impossible to get satisfactory anchorage with expansion units. Bolts may be 4, 4½, 5, or 5½ ft long, depending on where the best anchorage is ob-



WEST-PORTAL distribution plan shows location of surface substation and power cables serving mine, hoist, breaker, fan, pump and mine office. System is designed for safety and efficient, low-cost operation.



WEST PORTAL SUBSTATION with three 500-kva transformers reduces voltage from 44,000 to 4,160 and 440 for mine and surface equipment.

tained. All bolts are installed on 4-ft centers, and where the steel bars are needed they are predrilled on 4-ft centers.

Mining Results

Average production from the Lee-Norse continuous miner is 400 tons of raw coal per shift with a nine-man crew. To maintain this average output, the unit frequently mines much more.

Face equipment includes the Lee-Norse continuous miner, Acme twin-arm Jumbolter, three Joy 6SC shuttle cars and one Joy WL100 air compressor. Only the shuttle cars are DC-powered.

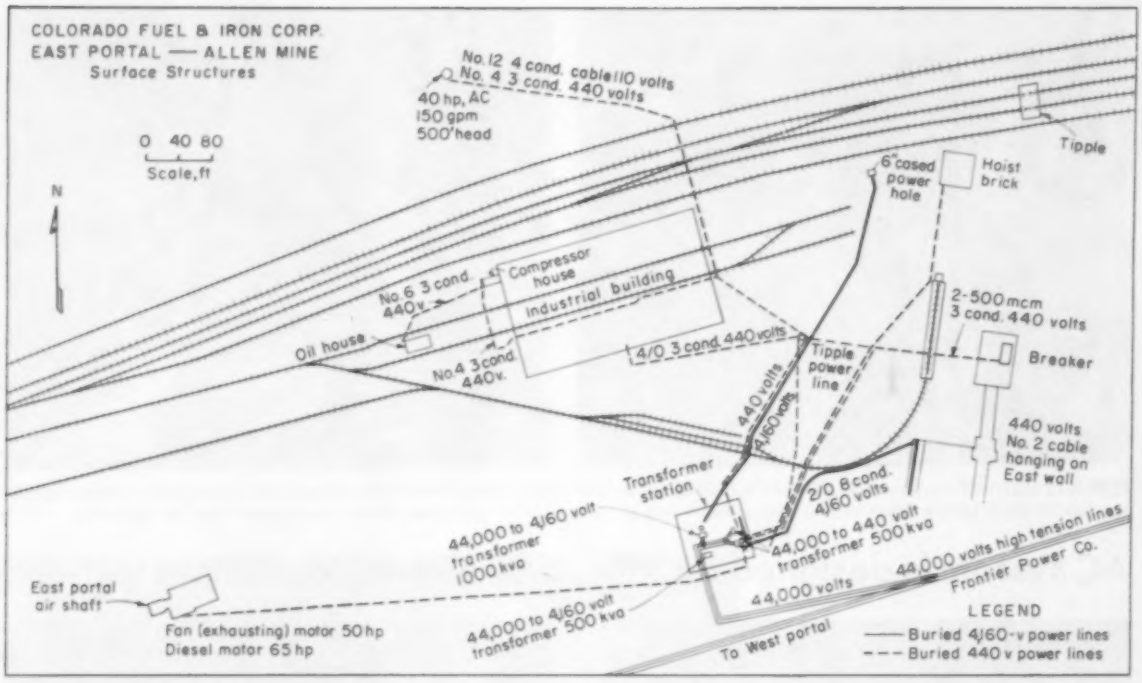
The face crew is made up of one continuous miner operator, 2½ roof-bolters, 2½ shuttle-car operators, one utility man, one mechanic and one foreman; a total of nine. If the haul is short, three men are used on roof-bolting. But if it is long three men are assigned to the shuttle cars.

Mining Methods

Since February of this year, the AC-powered Lee-Norse continuous miner has been working in a room panel previously developed with conventional equipment. Because continuous mining was a new venture for Allen mine and C. F. & I., and no other company in the immediate area had continuous miners, the company decided to maintain the same room centers as with conventional equipment.

Room-and-pillar mining begins at the inby end of the panel and continues on full retreat to the mouth. Rooms are driven 17 ft wide on 60-ft centers in pairs to a depth of 300 ft and the pillars are extracted immediately. As soon as one set of rooms and pillars is mined, a second pair of rooms is advanced from the same side of the panel.

After four rooms and pillars are



EAST-PORTAL distribution plan is similar to west-portal electrical layout. Transformer station includes one 1,000-kva and three 500-kva units. Protective devices are included for all branches of the power system.

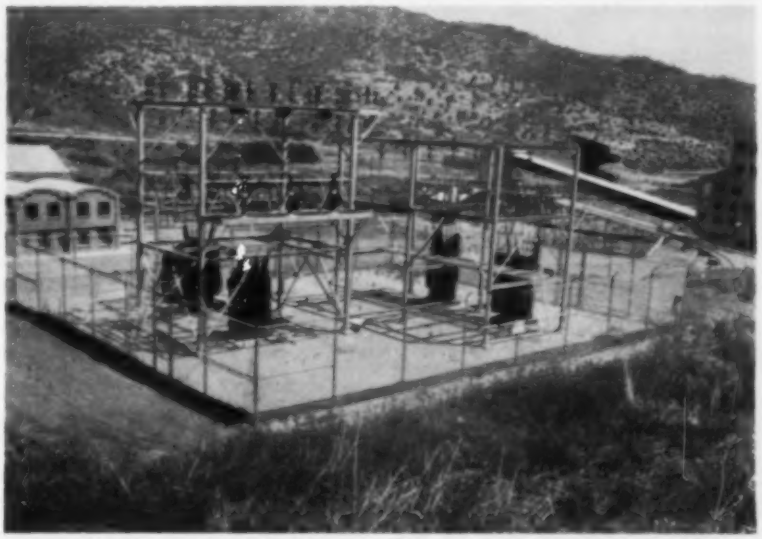
mined completely on one side of the entry, equipment is moved to the other side. Two pairs of rooms then are developed and pillars extracted as on the opposite side. Chain pillars are recovered in a flat line to keep pace with the room work. Mining alternates from side to side until the panel is completed.

It takes eight shifts to drive a pair of rooms 300 ft deep including crosscuts and another eight to recover the two rows of pillars.

Room-and-pillar transportation is provided by the shuttle cars which receive coal directly from the continuous miner and carry it to a 30-in Goodman panel conveyor equipped with U. S. Rubber belt. The panel belt in turn discharges into 8-ton steel dropbottom cars equipped with Willison automatic couplers. Loaded cars are pulled to the underground storage bin at the bottom of the slope by Goodman 10- and 20-ton locomotives.

In advancing rooms, the continuous miner alternates between the two. The normal procedure is to advance one side of a room 18 ft with the continuous miner, which has a cutting width of 8 ft 6 in. Then the machine is pulled back and a parallel cut is made for another 18 ft. Because of the fragile roof, and to avoid the hazard of exposing the operator to unsupported roof, the machine is trammed to the second room where another 18-ft advance is made. As soon as the continuous miner leaves a room, the bolting crew enters the place and uses the Acme Jumbolter to install wedge-type roof bolts. The twin-armed self-propelled unit is equipped with two Cleveland dust-collection stopers and Ingersoll-Rand impact wrenches.

In pillar extraction, bolts are installed in the pillar lifts in the same manner. A 12-ft protective wing, left on the gob side as the lift is advanced, is recovered on retreat after the lift cuts through. Roof support in the thin

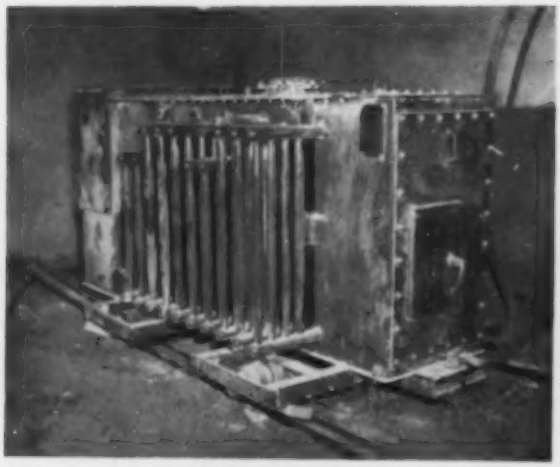


EAST PORTAL SUBSTATION has one 1,000-kva unit in addition to three 500-kva transformers. Mine power is received at common metering point.

CIRCUIT BREAKERS on surface provide individual protection for four branch power lines to fan, tipple, hoist and shops.

OIL DISCONNECTS on surface and underground make possible isolation of the various electrical circuits.

AC system is designed for efficiency with maximum protection



UNDERGROUND TRANSFORMER STATION reduces 4,160-V power to 440 for face equipment. Each section has one.

POWER CENTERS near face have outlets for trailing cables to mining equipment, provide protection in section.

wings is provided by straight posts set by the bolting crew.

AC Distribution

Power is purchased from the San Isabel Electric Association, Inc. which delivers the energy to Allen mine at 44,000 V. It is received at a common metering point and then split into two circuits for the east and west portals.

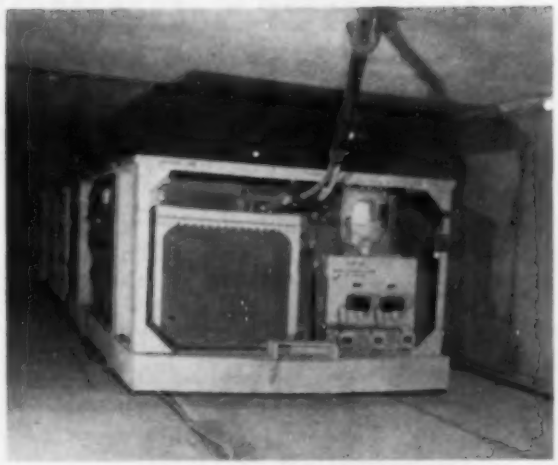
The east portal substation includes a total of 2,500 kva capacity, made up of the following Allis Chalmers tranformers: one 1,000-kva 44,000/-4,160 Y, one 500-kva 44,000/4,160 Y, and two 500-kva 44,000/440. The 1,000-kva transformer and one 500-kva unit serve the underground. The other two 500-kva transformers provide 440-V power for outside equipment.

The 4,160-V power cable is buried along the rib of the men and material slope. It is 2/0 3-conductor General Electric Supercoronal shielded cable and enters the coal seam through a drillhole 26 ft above the main entry. By using the shallow hole, the company brings the power cable into the mine at a point away from the busy slope bottom.

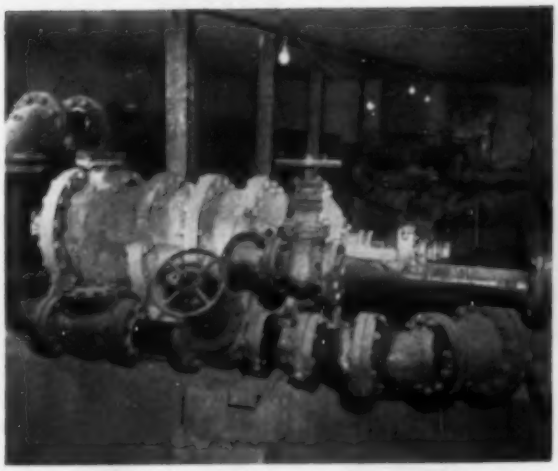
After leaving the borehole, the power is split into two circuits. One branch is 2/0 cable installed in a heading parallel to the main haulage and extends into the West and 3d South entries. The second branch is 1/0 cable and carries power to three sections in the Main North entry.

No power cables are installed in the same heading as the mainline track; instead they are located in an adjoining heading. All 4,160-V cables following the Main entries are buried at least 12 in deep and those in other sections are buried deep enough to provide protection against falling rock.

Westinghouse 7,500-V oil disconnects are installed at regular intervals in the power cables to make possible isolation of any area of the mine without interrupting power in other dis-



RECTIFIER in fireproof building provides DC power for shuttle cars and trolley locomotives. Units are in parallel.



MAIN PUMPING STATION, now under construction at low point in mine, has its own 4,160-V power circuit.

SUPERVISORS at CF&I's Allen mine near Weston, Colo. include John Dale (left), mine foreman; J. W. Irwin, chief electrician; and Glen Bivens, electrician.

tricts of the mine. Additional switches are installed at the mouth of each room panel so power to the face can be cut off.

Section Power

Each section has its own Westinghouse 300-kva Inerteen transformer that reduces the voltage from 4,160 to 440 for operation of face equipment. Disconnect switches are provided at the mouth of the entry so power to machines can be controlled independently. In the face area a Joy 3-way safety circuit center is furnished for the AC machines. Main feeder cables from transformers to safety circuit centers is 4/0 3-conductor with ground. Power is carried from the centers to the equipment by 500 ft of No. 2 3-conductor Type G cable with ground.

At the Allen east portal, three Westinghouse 300-kw rectifiers provide 275-V DC power for haulage and shuttle cars. On the positive side of the circuit, the company uses 6/0 trolley wire plus a 750,000-cir mil feeder or aluminum equivalent. The return is the two 90-lb rails which are bonded and crossbonded.

From the mouth of a panel, DC power is carried to the face area by 4/0 2-conductor Type G cable and terminates in safety circuit centers. Power is carried to the shuttle cars by 500 ft of No. 4, 2-conductor Type G cable with ground.

There are two Allis Chalmers 500-kva transformers on the surface at the west portal to step down voltage to 4,160 for transmission underground in the west portion of the mine and another 500-kva unit that provides 440-V power for outside service.

One 4,160-V circuit goes to the 1st South area and the other to a 4-in cased borehole that serves the 2d South section. Power for the 1st South section is carried by 1/0 cable. Energy for the 2d South is transmitted by 2/0 cable as far as the mouth of 2d South, then 1/0 cable is used. Power in the sections in the west portal areas is distributed the same as in the east portal section.

Another 4,160-V circuit enters the mine via a borehole near the east portal. A buried cable carries 4,160-V power from the main transformer station to the borehole and a 2/0 3-conductor 5,000-V cable transmits it 386 ft down the borehole to an underground pumping station, which is now under construction. A 300-kva transformer in the pumping station will further reduce voltage to 440 for operation of three 600-gpm Dean-Hill turbine pumps driven by 150-hp motors.

The pumping station is located at a low point in the mine and the company expects practically all mine water to flow by gravity to the sump. Water will be pumped to the surface through a 12-in borehole. Up to now there has been very little inflow because the mine is new and pillars have been extracted only in a small area. In the meantime the company is preparing the pumping station to handle any future inflow.

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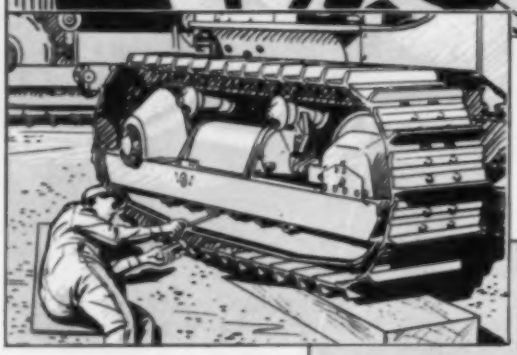
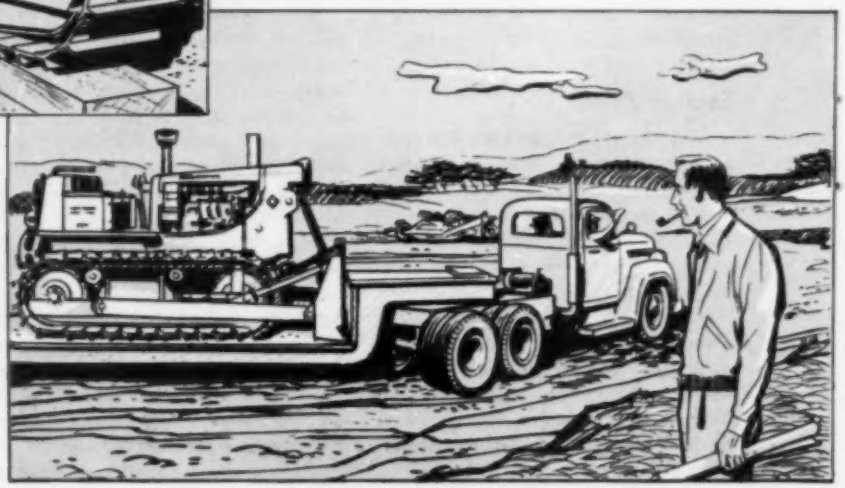


Detailed information on maintenance, adjustments and other facts on care of the machinery is delivered with the equipment. Operating tips are passed along to your men—to help them get started right and get the most from their equipment.



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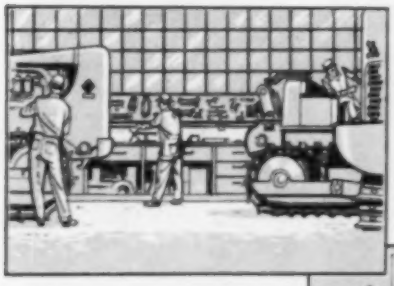
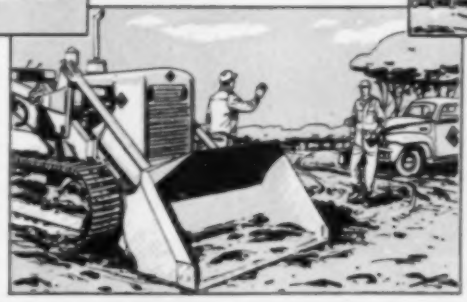


Shop service at your Allis-Chalmers dealer is fast and efficient—because it's handled by factory-trained men, using factory-approved tools, equipment and methods. Specialized mechanics and special facilities all help to speed service.

Scheduling checkups with your Allis-Chalmers dealer will insure that proper maintenance procedures are followed . . . stop trouble before it starts . . . keep your machines producing.



Prompt field service—a call—any time, day or night—brings a qualified serviceman and a fully equipped "mobile workshop." Result—problems can be quickly and accurately solved . . . equipment put back on the job with minimum delay.

. . . backed by a ready stock of original specification parts

ENGINEERED RIGHT

Allis-Chalmers parts are designed as original equipment . . . benefit from intensive metallurgical research. And each comes from the drawing boards of experienced construction machinery engineers.

MANUFACTURED RIGHT

Precision-made parts assure long-life service. They're made by skilled craftsmen on modern industrial machinery and are subjected to original-equipment inspection and testing.

TO PERFORM RIGHT

Each part is made of top-quality material, heat-treated to correct hardness and made to exact specifications. You can depend on them for full-capacity production on the toughest jobs you have.

The men of your Allis-Chalmers dealer organization know local conditions. Look to them for equipment recommendations to fit your job requirements . . . for true value in used machinery.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

Look ahead... *move ahead*...and stay ahead

with ALLIS-CHALMERS

BLOW-CHARGING of horizontal blastholes with ammonium nitrate and oil mixture increases loading density 20%, is much faster and easier than hand methods.

Faster, denser loading and better tamping result from . . .

Blow Charging Ammonium Nitrate

CLOSE-UP VIEW of loader shows main components of compact machine. Unit is mounted at end of portable air compressor towed by truck carrying nitrate and oil.

UP TO 20% GREATER loading density and a significant saving in time and effort are noteworthy advantages offered by a blow-charging machine undergoing tests in the field.

Experiments with an Atlas Powder Co. Jetloder at the Central Ohio Coal Co.'s Cumberland strip mine, Cumberland, Ohio, as an example, show that an 80-lb bag of Atlas ammonium-nitrate granules can be mixed with 1 gal of fuel oil in 20 sec and then blown into a horizontal drill hole in 10 sec. Under average conditions it takes 7 min to mix and blow-charge a hole with 480 lb of nitrate-oil mixture.

How the Loader Works

Better and lower-cost tamping also is possible with the aid of the Jetloder. For example, it takes only 40c worth of sand to tamp a hole by the blowing technique whereas it costs $2 per hole when conventional methods are used. Furthermore, the sand is packed tighter than possible with hand methods and packing is done much faster.

Components of the Jetloder are an 80-lb hopper covered by a screen fitted with a wiper designed to prevent lumps from entering the hopper; a conical-shaped internal closing device that is pulled up against the opening at the top of the hopper; valves, air jets, and 100 ft of 1½-in I.D. plastic hose. The unit is cast aluminum except the hopper, which is sheet metal. Future models will be all-aluminum. Total weight is 180 lb. At Cumberland mine it was mounted on the front end of an Ingersoll-Rand portable air compressor.

A typical cycle in blow-charging with ammonium-nitrate-oil mixture is as follows: An 80-lb bag of Atlas granules is dumped into the hopper and 1 gal of fuel oil is added. The conical closing device is pulled up to close the opening, converting the hopper into a pressure chamber. Compressed air at 40 psi is introduced through a valve at the bottom of the machine and delivered to the hopper chamber through the jets. The granules-and-oil mixture is whirled around in the hopper and then delivered to the horizontal blasthole through the plastic pipe. The man holding the hose in the blasthole is able to feel when the 80-lb batch has been packed into the hole.

PRIMER, 70 lb of semi-gelatin dynamite packed in 35 ft of 2-in sleeves, is pushed to back of horizontal hole before ammonium nitrate-oil mixture is blown in.

SAND is shoveled into blow-charger for tamping hole after charge is in place.

WATER is blown out with compressed air before hole is charged with ammonium nitrate-oil mixture. Wet holes are no problem when proper primer is used.

An average of 480 lb, or six bags, of the ammonium nitrate and oil mixture was blown into each hole at Cumberland mine. Loose sand is shoveled into the hopper and blown into the hole as tamping material after the nitrate and oil mixture is in place.

With hand loading methods only 375 to 400 lb of explosives plus a primer could be placed in a hole and only 20 to 25 ft of space was left for tamping material. It is possible to use 35 to 38 ft of tamping material if desired with blow-charging.

Each hole at Central Ohio Coal was primed with 70 lb of Gelodyn No. 1 packed in 35 ft of Atlas 2-in-diameter Twistite sleeves. Each sleeve is 2 ft long and the entire primer is made into a continuous stick by joining the threaded ends of the sleeves. Austin detonating fuse was tied to the primer before it was placed in the hole and du Pont 17-MS delay connectors were used between holes. The primer was placed before the nitrate-oil mixture was blown in.

Field experiments indicate that a compressor capable of delivering 105 cfm at 100 psi is needed for operation of the Jetloder. Atlas engineers point out that constant, unwavering air pressure is needed for best operation of the machine. Air pressure is reduced to 40 psi for blowing the ammonium nitrate and oil mixture. When blowing sand, air pressure to the machine is maintained at 60 psi.

Atlas Powder Co. has been working on the Jetloder for over a year. The model tested at Cumberland mine is the third built, the first machine being a pilot model for laboratory experimental work and the second a prototype for field testing. The prototype machine was taken to Illinois for field testing in April, 1958. Later it underwent further testing at 12 different mines in West Virginia. After 37,000 lb of nitrate-oil mixture and 4,000 lb of sand had been blown through the machine, it was returned to the laboratory for evaluation and alteration. It now is in service in West Virginia.

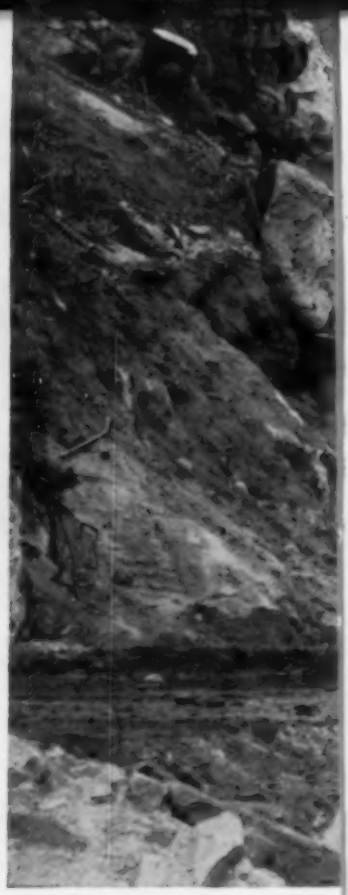
The machine used at Cumberland mine was made after the first prototype unit was field tested. Design refinements have boosted capacity to nearly twice that of the first machine. Both of the early models are batch machines, but Atlas engineers are designing a continuous-feed unit to speed the mechanical operation.

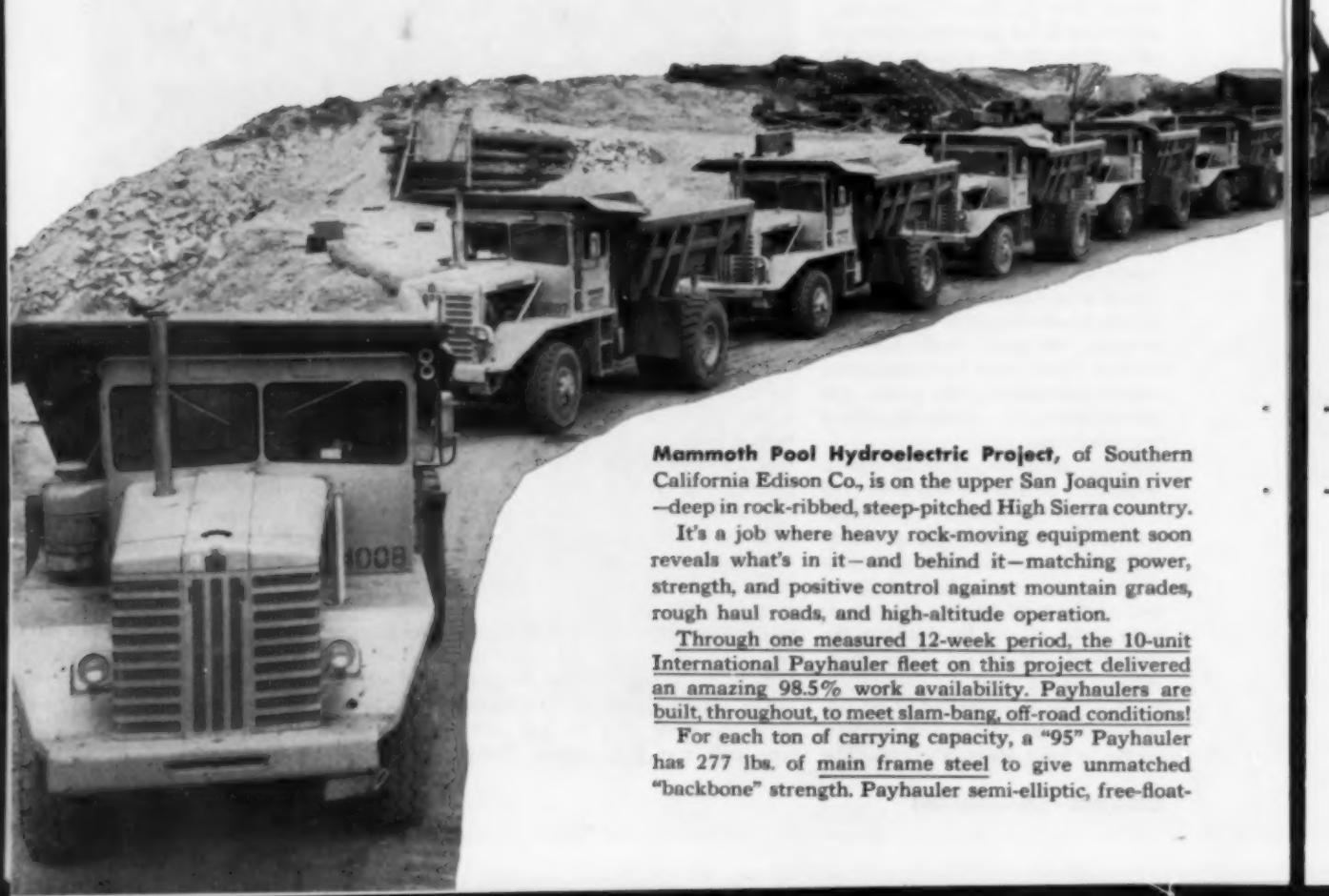
Horizontal blastholes in the test area at Cumberland mine were drilled 80 ft deep with a McCarthy drill. Holes were spaced 20 ft apart and about 4 ft above the base of the overburden. Overburden in the area included shales and surface material and was 50 to 60 ft thick. The ammonium nitrate and oil mixture was used in the ratio of 1 lb to 5 cu yd of overburden.

"95" Payhauler® fleet delivers 98.5% availability

highballing rock loads over High Sierra grades

FOR SOUTHERN CALIFORNIA EDISON CO., LOS ANGELES



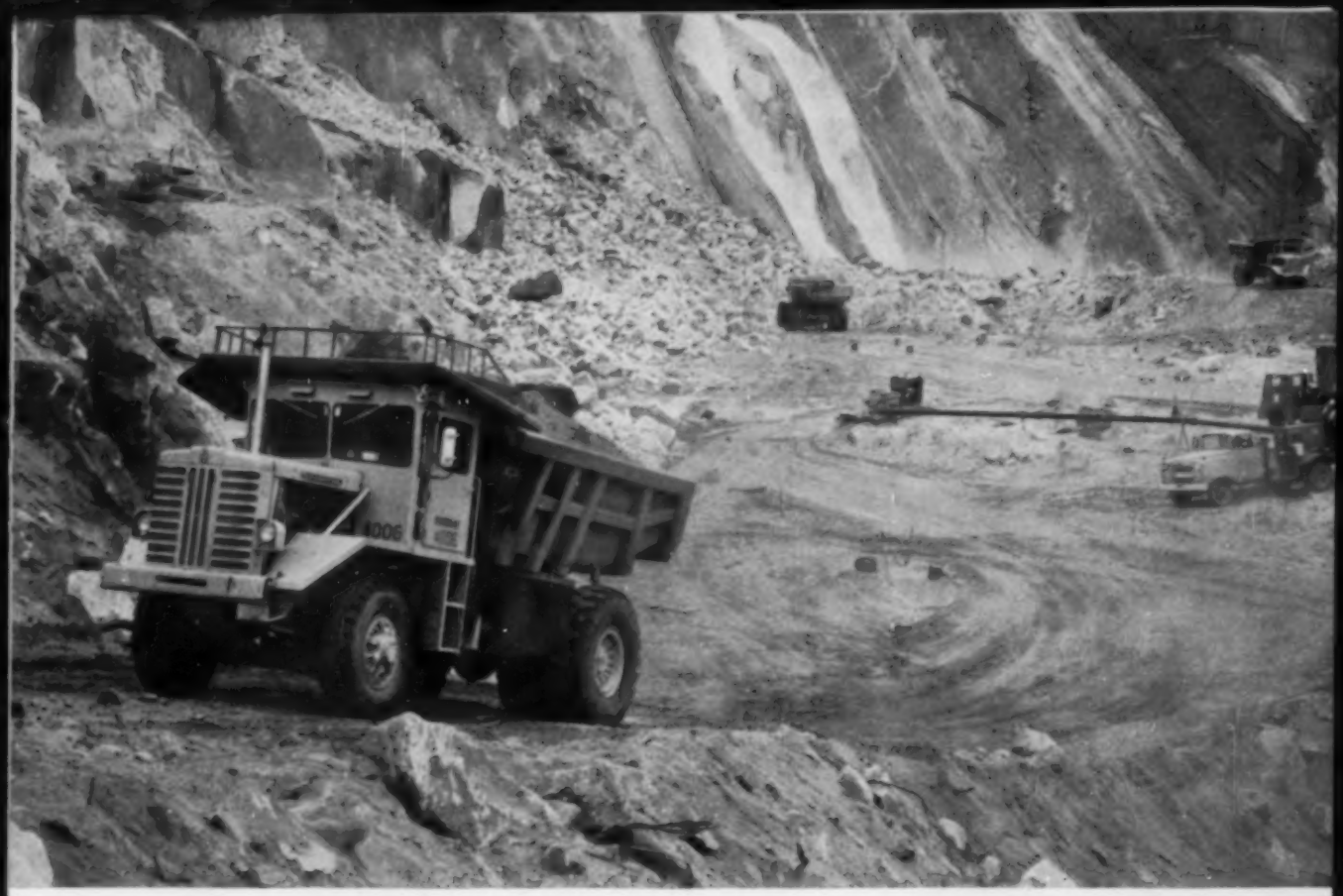


Mammoth Pool Hydroelectric Project, of Southern California Edison Co., is on the upper San Joaquin river —deep in rock-ribbed, steep-pitched High Sierra country.

It's a job where heavy rock-moving equipment soon reveals what's in it—and behind it—matching power, strength, and positive control against mountain grades, rough haul roads, and high-altitude operation.

Through one measured 12-week period, the 10-unit International Payhauler fleet on this project delivered an amazing 98.5% work availability. Payhaulers are built, throughout, to meet slam-bang, off-road conditions!

For each ton of carrying capacity, a "95" Payhauler has 277 lbs. of main frame steel to give unmatched "backbone" strength. Payhauler semi-elliptic, free-float-



"95" Payhaulers are "horsing" their 24-ton rock loads up grades as steep as 18%—on the Mammoth Pool Project! The "95's" Turbo-charged diesel engine develops 335 hp—the 18-ton "65's" is 250 hp!

Here's part of the 10-unit "95" Payhauler fleet parked during noon-hour, that established the amazing 98.5% availability record on Southern California Edison's Mammoth Pool Project!

Two rock-loaded "95's" are on their way—while a third one spots its big-target body for the shovel. Five International Planet-Power steered TD-24's and 12 UD-6 International power units on generators also help make this $50 million job roll!

ing springs gain extra shock-swallowing support from extra leaves and extra length. Payhauler speeds match every load and road. And Payhauler exclusive integrally-forged full-floating planetary drive axles take full-torque loads without over-stress.

This extra built-in stamina helps International Payhaulers establish standout availability records. And so does ready availability of parts and service from your International Construction Equipment Distributor's well-stocked bin and well-manned shop—backed by factory warehouse parts reserves.

See how a Payhauler's bonus of Turbo-Charged diesel power assures you fuel-thrifty, big-load performance—even at high altitudes. Watch how power on Payhauler rear wheels helps deliver top operating efficiency on steep grades or mucky conditions—even where trailer-type units "spin their wheels." Prove that Torqmatic braking safely and positively controls the fully-loaded "95" downgrade—with little or no foot-brake help! See your International Construction Equipment Distributor for a demonstration!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

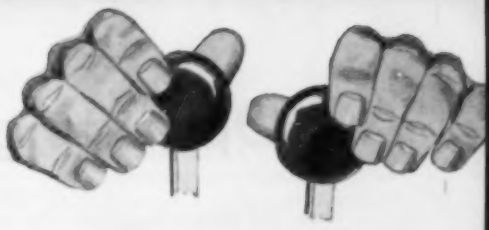
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

FEATHER-TOUCH CONTACT

As the TD-24 pusher approaches the Payscraper, operator slows tractor speed *with one hand* by power-shifting planetary system; and by depressing the foot decelerator. He gets feather-touch contact without declutching, brake-riding, or throttle change!

HIGHER REVERSE

Operator uses decelerator pedal to slow engine at end of pusher run, permitting faster reverse shifting. Fast reverse speeds, coupled with power-shifted planetary steering system, allows TD-24 operators to reposition pusher extra fast and reduce scraper pick-up time.

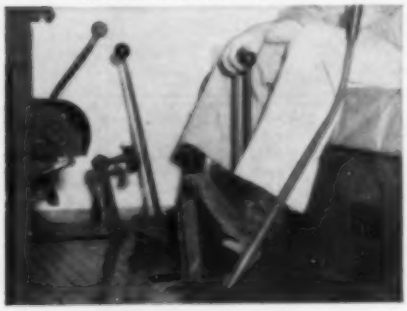


Your operators have fingertip control of greater push-loading profits because...

PLANET-POWERED "24's" beat other rigs on all four steps of the push cycle!

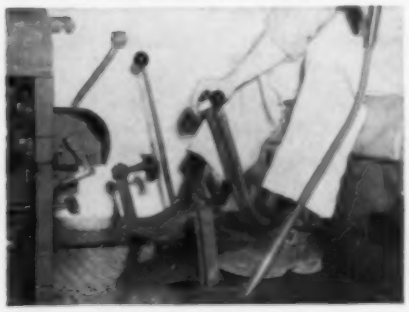
"CONSTANT CONTACT" LOADING

Releasing foot decelerator instantly applies full power, for efficient loading. Power-shifting either track into high range maintains solid pusher contact on curves—applies TD-24's full power, through both tracks!



GEAR HIGHER KICK-OUTS

Once scraper is fully loaded, the TD-24 *follows through* as operator power-shifts on-the-go with one hand to higher gear range, boosting speed of both units 27%. This allows most scrapers to come out of the cut a gear higher.



Your push-loading profits are in your operator's hands. And your operators know they can load out more scrapers every shift when their hands control the boss of the borrow pit—the International TD-24 crawler. The four-step pusher cycle (shown) pinpoints reasons why your operators and TD-24 pushers can increase production with easier control—from contact through kick-out.

Only the TD-24 gives you this big difference in pushers: more productive effort at the fingertip command of your operators! Exclusive Planet Power steering lets your operator: 1) keep pusher speed matched to that of the scraper; 2) power shift either or both tracks up or down a full speed range with a mere flick of the finger; and 3) apply full power to both tracks even if scraper cut is made on a curve.

And your TD-24 operators can fully utilize the decelerator pedal to cut maintenance costs three ways. The decelerator reduces engine clutching; eliminates brake pedal riding for steering; and permits feather-touch scraper contact without slam-bang jarring of operators and machines.

Get all of these TD-24 features that cut the cost of loading out paydirt, with either a Torque Converter or gear-drive tractor best suited to your needs.

If you're a dirtmover, get the TD-24 stay-on-the-job story by checking with any of the thousands of owners. Ask about the comparative life of such important components as track rollers and rails, engine, transmission, and planetary steering system. Get a TD-24 on your job today by calling your International Construction Equipment Distributor for a demonstration. Then you'll see how the TD-24 earned the right to be called "Boss of the Borrow Pit."

International® *Construction Equipment*

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

AC Operating Regulations

How 23 states regulate the use of AC in coal mining.

By **C. L. Brown**, Mining Engineer (Electrical), Health and Safety Dist. B, U. S. Bureau of Mines, Pittsburgh, Pa.

THERE IS NOW A DEFINITE TREND toward wider use of AC for operating mining equipment, a field in which heretofore direct current has had a monopoly. This trend has emphasized restrictive provisions discouraging use of AC in some states. Frank discussion of some of these problems may result in a better understanding and stimulate governing bodies to plan revision of their laws in the interest of standardization.

The wide difference in maximum voltage specified for operation of mining equipment in the various states reflects the need for greater uniformity in state mining laws. Introduction of continuous mining equipment has created serious power transmission problems in states limiting low-voltage circuits to 300 V or less. Likewise, the trend to larger locomotives has increased power demand for haulage.

Minimum attention has been given

State Regulations on

	Maximum AC high voltage	Maximum AC low voltage	Cable required for high-voltage installations	Location and installation, high-voltage cable	Splicing or joining sections of high-voltage cable	Fault protection		Type transformer	Transformer station enclosure
						High voltage	Low voltage		
Ala.	Not stated	Not stated	Not stated	Supported on insulators	Continuity of armor and conduit to be maintained	Automatic cutouts	Overload devices	Air-cooled or nonflammable liquid	Fireproof enclosure for oil-filled; door sills
Ark.	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated
Colo.	Not stated	600	Lead used in dry locations only; reference made to armored	Approved manner, supported at 5-ft intervals	Not stated	Fuses or circuit breakers	Fuses or circuit breakers	Air-cooled or non-flammable liquid	Fireproof or fire-resistant means to confine oil
Ill.	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Fireproof construction
Ind.	Not stated	650 phase to ground	Not stated	Regularly inspected passageways; protected from damage	Strength, insulated adequately, armor continuous	Automatic devices	Automatic devices	Air-cooled, nonflammable liquid, or inert gas	Fireproof underground structures
Iowa	Not stated	Not stated	Armored or insulated above 100 volts	Safely located	Not stated	Not stated	Not stated	Not stated	Not stated
Ky.	Not stated	440	Shielded	Buried or protected against contact; installed in intake air	Not stated	Overload protection	Overload protection	Not stated	Barrier for oil-filled
Md.	Not stated	Not stated	Adequate for service intended	Permanent — guarded against mechanical damage	Not stated	Fuses or circuit breakers	Fuses or circuit breakers	Air-cooled or nonflammable liquid	Fireproof construction
Mont.	Not stated	Not stated	Adequate for service intended	Permanent — guarded against mechanical damage	Not stated	Short circuit, overload	Short circuit, overload	Air-cooled or nonflammable liquid for new installations	Fireproof construction
N. Mex.	Not stated	550	Metallic sheath or armor	Armored type permitted in return airways	Not stated	Overload and short circuit	Overload and short circuit	Not stated	Fireproof room
Ohio	5,000 phase to ground	260 except by approval	Insulated for 150% voltage, in conduit, or armored	In or on bottom or suspended	Not stated	Circuit breakers and fuses	Circuit breakers and fuses	Not stated	Approval of Dept.

to high-voltage power transmission. Some regulations in force appear to restrict efficient transmission of large quantities of power.

Standardization

State laws generally have not kept pace with development of high-voltage cables and protective equipment. This is an obstacle to the introduction of AC in mines. Lack of uniformity in requirements for installation and location of high-voltage circuits is not conducive to good engineering standardization.

Much would be contributed to the efficiency of coal mining and associated industries if state laws were standardized to permit installation and use of modern electrical equipment supported by good engineering techniques. Important among the changes needed are:

1. Standardization of maximum voltages to permit efficient operation of modern mining equipment.
2. Provision for use of latest developments in power cables.
3. More liberal restrictions on location and method of installing properly protected cables.
4. Standardization of cable sectionalization and splicing requirements.
5. Insulation specifications for air-cooled transformers and ventilation requirements for nonflammable oil-filled transformers.
6. Specific requirements for protection against faulted circuits.
7. Standardization of requirements for installation of transformer stations in coal mines.

Reference to state laws in this paper are based on interpretations by the author and may not coincide with interpretations by the governing bodies.
Kansas, Missouri and North Dakota have no regulations on electricity.

AC Installations

	Maximum AC high voltage	Maximum AC low voltage	Cable required for high-voltage installations	Location and installation, high-voltage cable	Splicing or joining sections of high-voltage cable	Fault protection		Type transformer	Transformer station enclosure
						High voltage	Low voltage		
Okla.	Not stated	Not stated	Adequate for service intended	Permanently guarded against mechanical damage	Not stated	Overload and short circuit	Overload and short circuit	Air-cooled or nonflammable liquid	Fireproof unless air-cooled or nonflammable liquid
Pa.	Not stated	650	Metallic armor or conduit armor continuous	Intake other than haulageways, buried not less than 12 in. or conduit	Junction boxes or permanent splices	Oil breakers, fuses 25 kw or less	Fuses	Limit of 20 gal flammable liquid	Suitable chamber, intake air, 20-gal oil limit
Tenn.	Not stated	Not stated	Adequate for service intended	Permanent, guarded against mechanical damage	Not stated	Overload and short circuit	Overload and short circuit	Air-cooled or non-flammable liquid	Portable fireproof; door sills for flammable oil
Utah	Not stated	440	Adequate for service intended	Intake air	Mechanically and electrically efficient	Circuit breaker or fuse	Overload and short circuit	Not stated	Fireproof
Va.	Not stated	480	Not stated	On insulators unless buried	Not stated	Overload and short circuit	Overload and short circuit	Air-cooled or nonflammable liquid	Fireproof housing unless of fireproof design
Wash.	Not stated	600	Lead covered or armored, restricted by type installation	Insulators unless grounded armor; intake air in gassy mines	Electrically efficient, adequate insulation; metallic armor continuous	Overload and short circuit	Overload and short circuit	Not stated	Suitable chambers, in intake air
W. Va.	2,200 and above by approval only	440	Individual conductors shielded; shielding continuous and grounded	Intake air other than travelways unless buried 12 in	Not stated	Overload and short circuit	Overload and short circuit	Air-cooled or nonflammable liquid for new installations	Flammable oil in fireproof structure
Wyo.	Not stated	240	Adequate for service intended	Permanently installed, guarded against mechanical injury	Not stated	Overload and short circuit	Overload and short circuit	Air-cooled or nonflammable liquid	Fireproof structure
Alas.	No limit on armored cable	Not stated	Armored, pickproof cable	Not stated	Not stated	Overload and short circuit	Overload and short circuit	Not stated	Fireproof structure

"USING FORD HEAVIES HAS MADE A BIG CUT IN OUR MAINTENANCE COSTS"

says Allen Grosse
Fleet Supervisor
Green Bay Box Company

Handling heavy loads with ease, this Ford C-1000 used by the Green Bay Paper and Pulp Company (an affiliate of the Green Bay Box Co.) grosses 60,000 lb. It is equipped with 260-hp 477-cu. in. Super Duty V-8, Extra Heavy Duty 5-Speed transmission and 6.50 to 1 rear axle ratio.

GO FORD-WARD for Savings, Style and Stamina!

Whatever your job . . . wherever you do it—you'll find Ford Heavies and Extra Heavies are engineered and built to do it better! And the '59 improvements in these models will bring still more benefits to your operation.

Greater operating economy with new, faster rear axle ratios and wide choice of transmissions.

More efficient parking brake of the internal expanding type has approximately 50% greater stopping and holding ability, requires less than half the operating effort needed for the previously used type.

Higher payloads and longer life with new, higher-capacity front and rear axle options.

Factory installed tractor package custom-fitted to Ford trucks for safer, more dependable braking.

Yes, the new '59 Ford trucks are here to take you *Ford*-ward for savings, *Ford*-ward for modern style and stamina. See your Ford Dealer today!

"Our records show that our average monthly parts cost, including major overhauls, has been reduced over 24%.

"Our Fords have given us less trouble than any other make of truck we've owned! Also, our Ford Dealer has always given us immediate and very good service. We've never had any downtime waiting for parts. They're always available at our Ford Dealer's, so we don't have the problem or expense of carrying a big parts inventory.

"Our drivers sure like the 'hillability' of the big Ford Tilts with their Super Duty V-8 engines! They say the 'Big V' has sure got it for power that seems to level out the steepest hills. And the Tilt Cabs are tops for maneuverability and riding ease.

"Performance plus economy . . . that's why we're sold on Ford trucks. We started using Fords when we opened our trucking department in 1954, and today 28 of our 35 trucks are Fords."

New Styleside pickups! Notice the handsome new grille, dual headlights, stronger wrap-around bumper. 6½-, 8- and 9-ft. boxes available in Styleside or Flareside models. Short Stroke Six or V-8 engines.

FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . LAST LONGER, TOO!

"We can make coal a dynamic growth industry geared to serve as America's prime energy source, or we can live in a state of comatose serenity expecting the best and suffering the worst. Which course will we choose?"

Whither Coal?

By **Reed Moyer**, Berkeley, Calif.

WHAT IS HAPPENING in coal markets—and what could happen in the future? Production during the early months of this year ran at an annual rate even lower than the 1954 output of 392 million tons—the lowest yearly total in 20 yr. As a natural result optimism for the future is more restrained than in 1955 and 1956, and forecasts of increases in tonnage are being examined much more closely. Nevertheless, the conclusion still is that coal is a "growth" industry.

Is this a justifiable label? In a searching article in the September-October, 1956, issue of the *Harvard Business Review*, Peter S. Bernstein analyzed the qualities making up a true growth company. His yardsticks are equally valid if applied to an industry as a whole. As Bernstein expressed it, "The ability to create its own market is the strategic, the dominating and the single most distinguishing characteristic of a true growth company [industry.]" Can the coal industry qualify under this definition? It is difficult to come up with a flat "Yes."

Key Factor

In what respects are we failing to meet Bernstein's tests? Borrowing from the sociologist, David Riesman, Bernstein says we must determine whether the company [industry] is merely responding to external stimuli or is developing its own markets. Is it riding the crest of a wave of growth externally created or is it affirmatively shaping its own destiny?

A quick analysis reveals that our anticipated future dynamic growth hinges on external stimuli, the most important of which is an expected explosive increase in coal use by the electric utilities. Have we given enough consideration to the prospect that this rosy future might not materialize? Two developments could diminish the potential for coal.

MR. MOYER will be known to many coal men through his association with the Sherwood stripping group, including the Stonefort Corp., with headquarters at Indianapolis, of which he was vice president. In August Mr. Moyer enrolled in the University of California to obtain his doctorate in economics after which he plans to teach. As a result of his experience in coal, Mr. Moyer reached certain conclusions on its economic outlook, which he incorporated into the accompanying article, along with his thoughts as to the steps coal should take to realize more fully on its opportunities in the years ahead.

First, of course, the rate of growth of electricity consumption, spectacular in the past generation, could slacken. Electric power use has doubled in each of the last several decades. Estimates of its future consumption assume this trend will continue unchecked. Often indeed, the future is a mirror image of the past. While it is possible that changes in population growth, saturated demand or other conditions might adversely affect electricity's future growth rate, we are probably justified in accepting as valid the strong evidence of the continued growth of power usage. Let us assume, therefore, that the Age of Electricity is a vital and growing phenomenon.

What Can Coal Capture?

The second potentially adverse development should give rise to more concern. What share of the energy market will be captured by coal? To answer this question we need to study our competitors: hydroelectric power, the other fossil fuels and, finally, that giant lurking offstage: nuclear energy.

It is an acknowledged fact that the available sources of hydroelectric power are limited by nature. The public welfare demands that these sites be developed to their fullest potential. In the aggregate, though, these devel-

opments will not account for more than a small percentage of future energy requirements.

The fossil fuels present a sterner competitive challenge. The phenomenal rise in gas and oil consumption for the generation of electric energy is well known. In the two-decade period 1937-57 coal use by electric utilities has increased by a very respectable 290% from 41 to 160 million tons. During the same period, though, oil use has increased 500% and gas has led the field with a rise of 691%!

We find solace in the knowledge that gas costs are steadily increasing and that reserve supplies are dwindling. True, gas costs are rising but with rare exceptions this industry is not pricing itself out of the utility market. There are still large new blocks of dump gas available for use by the utilities at competitive rates. As for the second hope—that reserve supplies are dwindling—this condition does exist to a degree but is not as serious a possibility as we are often led to believe. The famous TNEC investigation of the gas industry in the late 1930s revealed gas reserves totalling less than a 30-yr supply. Today, 20 yr later, with sharply increased gas consumption, gas reserves still total more than a 20-yr supply. In the long run, then, diminishing gas supplies may strengthen our position. But let us remember Lord Keynes' pungent quip that in the end we are all dead.

Nuclear Competition

The last and toughest competitor to assess is nuclear energy. The initial enthusiasm which accompanied the realization that the world had a new energy source has been tempered with time. Those responsible for the peaceful development of atomic energy now must solve the myriad engineering difficulties facing them. American engineering know-how has licked other problems and it stands to reason that it eventually will find a way to produce economical nuclear power.

The biggest unresolved question now in not whether we can produce atomic power. The Shippingport plant has proved we can. Rather it is: "At what cost can it be produced?"

Conventional plants using coal produce power in this country at a cost of 4½ to 9 mills per kwh. In a significant National Industrial Conference Board report, W. Kenneth Davis, then director, and Louis H. Roddis, deputy directory of the Div. of Reactor Development, Atomic Energy Commission, predicted nuclear power costs of 10 to 13 mills per kwh after the initial shakedown of the first-generation nuclear power plants. These are the plants which will go into operation in the years 1960 to 1964, to be built on the foundation of experience learned from the current experimental work at Shippingport and elsewhere.

Test Period For The Atom

The period from 1965 to 1980 will provide the severest test of nuclear power strength in this competitive battle. Davis and Roddis predict atomic power costs of 6 to 7 mills by 1980, making this energy source competitive with all but the most-economical coal-fired plants. Based on these estimates, they predict a total nuclear generating capability by 1980 of 227.2 million kw, 32.5% of all generating capacity. More significantly, during the 1975-80 period nearly 70% of all new generating capacity will be represented by nuclear plants.

We see what can result from 6- to 7-mill atomic power. What are the possibilities of power costing 4 mills or less, a cost sufficiently low to undercut today's most economical coal-fired plant?

Consider the immense strides the British have made in the development of economical atomic power. The necessity for finding cheaper fuel sources spurred them into action as soon as the second World War ended. Britain's atoms-for-peace offensive has, therefore, given them a 5-yr head start over the Americans. England's equivalent of Shippingport—Calder Hall station—has been in commercial operation for over 2 yr, producing power, acording to British sources, at a cost of 8 to 9 mills per kwh. Other British official estimates predict future nuclear power costs per kwh as follows: 1960, 7.7 mills; 1970, 5.5; 1980, 4.4; 1990, 3.7 mills. It is one thing, of course, to predict such costs and another to make good the predictions.

Not Powerless

It is also easier to detect problems than it is to find solutions to them. We are certainly not powerless, though, to take individual and collective action to improve our competitive position.

First, operators who are large suppliers to utilities burning residual oil and dump gas can take a stronger stand in opposition to this disruptive practice. Heretofore our efforts to prevent these sales have taken the form of appeals for government intervention, either to restrict residual oil imports or to ban dump-gas sales. This approach, commendable as it may be, has not been overwhelmingly successful. We need to do more.

Strong individual coal suppliers can take a page from the gas distributor's book by negotiating conditional sales contracts. These contracts would penalize the utility for its use of interruptible gas by charging a higher price where this practice is followed. The principle has been established in some isolated cases and would achieve more widespread use if adopted as an industry policy.

Enlisting Support

Railroad support could be enlisted along the same line to discourage the utilities' purchase of interruptible gas. Railroads, like most industries, need a large continuous volume of business to remain profitable. When interruptible gas replaces coal as a boiler fuel the railroads suffer along with the coal industry. Yet railroad tariffs provide a single rate to a given destination, making no distinction between intermittent receivers of coal and those who take coal on a year-round basis. It has been suggested that we persuade the coal-hauling roads to set up a dual rate structure, favoring the faithful coal user, to complement the industry effort to promote a similar pricing policy. This sweeping reform could exert a significant influence on coal's future.

We must continue to enlist the constructive support of government, not to favor coal over other fuels but to maintain a balanced relationship among the various energy sources. We should reconsider the policy of attacking below-cost sales of natural gas. Would we agree to the application of that restriction to coal? The question answers itself. If it is unfair to coal, it is equally unfair to gas.

A more positive approach would be an amendment to the Natural Gas Act declaring as public policy the need to preserve natural gas for its unique and higher uses. Complying with this new provision of the law, the Federal Power Commision would

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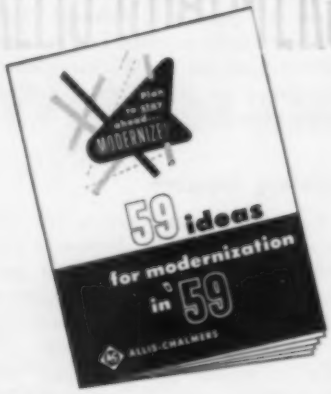

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Electrical modernization includes placing substations close to machines being served.

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find it hard to ju..ify an application calling for the sale of interruptible gas as a boiler fuel.

Conservationist Aid

The conservationists, a large and articulate lobby, should be pressed into service to wage the battle of conserving our precious gas supplies. Senators and congressmen from the western states particularly, to whom conservation is the watchword of their public service, should add natural gas to the traditional resources—water, forests and grazing lands—which they so zealously protect. Their support, supplementing work done by the coal-bloc legislators, might tip the scales in favor of this much-needed legislation.

Again on the governmental front, we need to intensify our drive to present coal's story effectively. NCA, under Tom Pickett's able direction, has made a determined effort to do this job but it needs support in the field. We should organize regional political seminars throughout the country, attended by congressmen, senators, governors and, in some cases, state legislators, as well as leading coal officials, where our problems could be explained and discussed openly and frankly. At this year's NCA convention, Senator Thruston Morton, of Kentucky, a loyal supporter of coal, pointed up the difficulty of getting Congress to understand fully the residual-oil import problem, even after debating the question repeatedly over a period of several years. The regional seminar idea would alleviate specific problems of this type and in addition would improve the legislative climate for coal in general.

Growth Yardstick

For a final suggestion, we need to return to Bernstein's "growth" yardstick the ability to create one's own market. How could this better be done than through effective research? Certainly, research is no panacea, but it represents a constructive first step. It permits us to rely more on self-sufficiency and less on response to external stimuli.

To appreciate the need for an enlarged industry research program, picture the industrial world of 1975 and assume that nuclear power is available at 4 mills per kwh. Barring major changes in the cost of burning coal, such an energy revolution would seal coal's fate. If we knew now that the future held this condition in store for us, would we throw up our hands in despair, or would we take affirmative action to help ourselves?

Massive Research the Key

I suggest we undertake a massive research program, using BCR as a nucleus, financed by an industry-wide assessment secured through a union check-off system. The size of the assessment would be predetermined to provide sufficient income to sustain a workable, realistic research program. If experience indicated later the need for additional funds they could be raised by increasing the assessment. A 2c assessment of all unionized mines would impose the same burden on all operators and would increase the delivered cost of coal in relation to competitive fuels by approximately ¼ of 1%. Think of the compensating benefits that could flow from the research expenditure of the $7½ million which that assessment would raise.

The initiative for the assessment should come from the operators during labor contract negotiations. In addition to setting up the assessment mechanism, the plan would call for a governing board composed of coal operators, research personnel and representatives of the UMWA, with control vested in the operators.

Will John L. Lewis and the Mine Workers agree to this plan? Quite possibly they might not. By the same token, the operators are generally less than enthusiastic when faced with wage increases. There is nothing, however, that denies management the right to bargain in its own interests, just as the union bargains for improved wages and working conditions. And this scheme has the added advantage of securing benefits for both parties. For the operators it expands markets, at the same time providing job opportunities for miners. Moreover, to the extent that this plan strengthens the industry, it similarly strengthens the union's future bargaining position. A healthy industry can better afford a high wage scale than can a sick one.

The choice is ours to make. We can make coal a dynamic growth industry geared to serve as America's prime energy source, or we can live in a state of comatose serenity expecting the best and suffering the worst. Which course will we choose?

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*Herringbone**

two ropes in one!

Here is a combination that has proved itself during three years of field testing. A welcome addition to Roebling's great line of wire ropes, Royal Blue *Herringbone* is both a regular lay and lang lay wire rope!

So, in one rope you have the greater flexibility and abrasion resistance of lang lay construction *plus* regular lay's superior stability under severe operating conditions.

Preformed Herringbone is made of two *pairs* of lang lay strands, and two strands of regular lay which separate the two pairs of lang lay—all of it made of Type 1105 rope wire.

For three years Herringbone has been used for general hoisting, holding and closing lines, shovel ropes, wagon scraper ropes and dragline ropes. Without reservation, its performance has been superior to that of any other rope used for the same jobs . . . even in the hands of inexperienced personnel! *Its proven capabilities clearly suggest its use for all jobs where steel core ropes are normally used.*

See your Roebling salesman for all the facts or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey. Roebling Herringbone, the two-in-one rope to meet the *doubly* stringent demands of today's economy.

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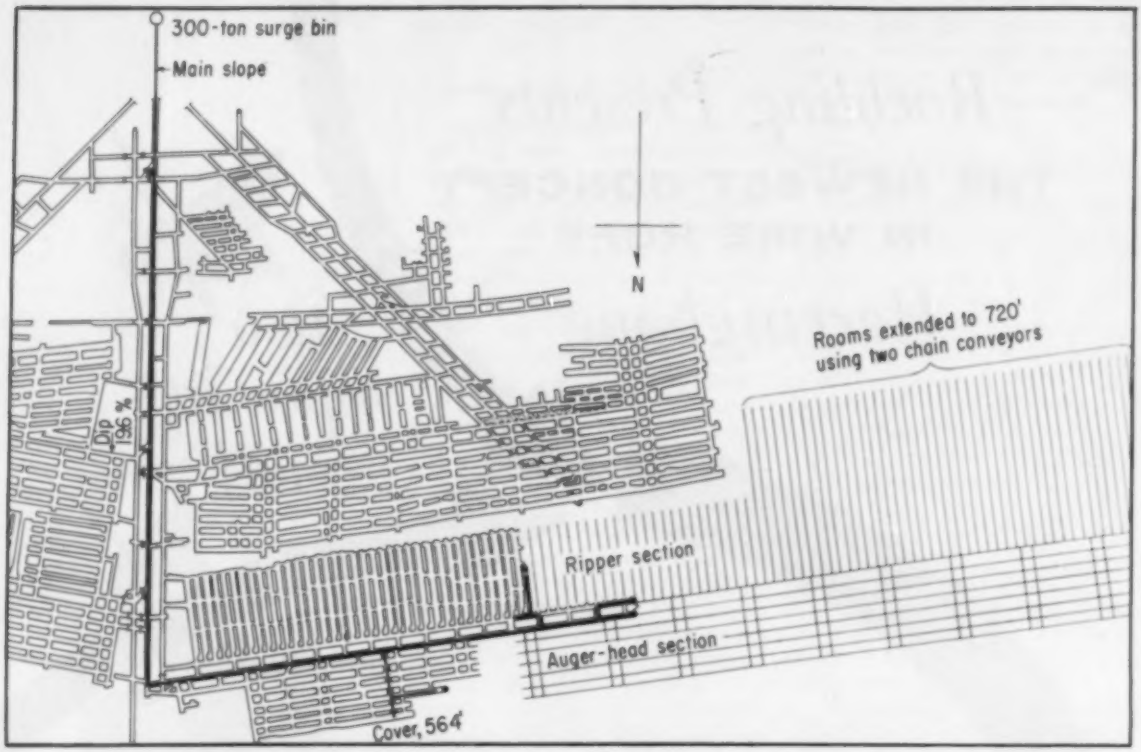


FOUR STAR MINING PLAN is based on slope down the 19.6% pitch with levels right and left. New levels for ripper and auger-head machines employ up-pitch places with slabbing, and across-pitch places driven full width.

Flexible Continuous Mining

Two types of machines meet variations in top character and thickness of coal at Four Star Collieries Co., Ltd. Two-sided levels provide for mining up the pitch on one side and across the pitch on the other. Average coal thickness is 45 in.

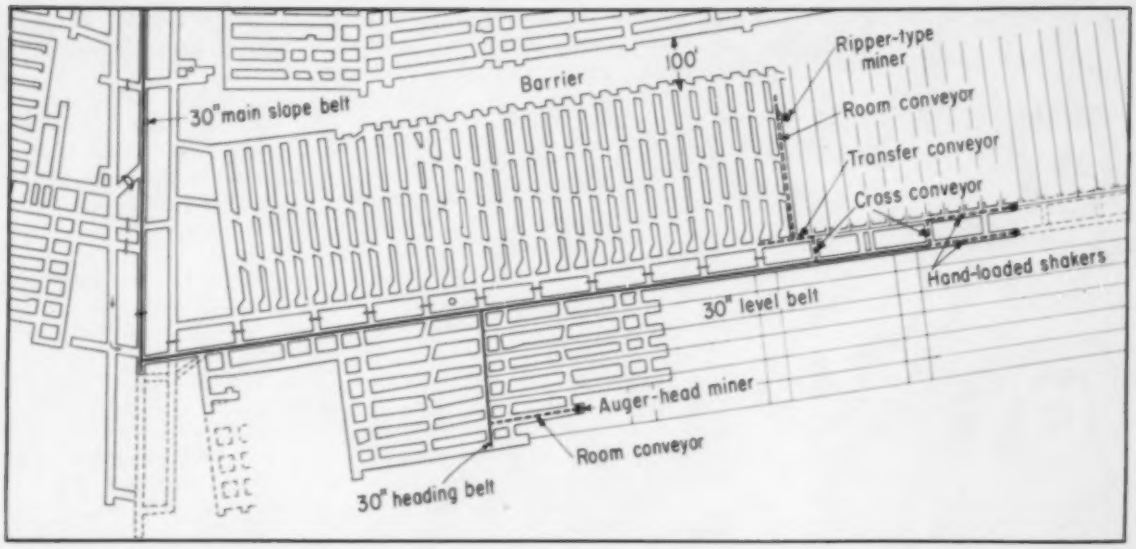
A COMBINATION of equipment, with appropriate methods for each, has been the end result of an evolution in continuous mining to meet thickness and top conditions at the Four Star mine of the Four Star Collieries, Ltd., Broughton, 12 mi south of Sydney, Nova Scotia. A ripper-type machine, the first to be installed, operates up the pitch on one side of a level, while an auger-head unit drives places across the pitch on the opposite side.

A part of the Bras d'Or Coal Co. group headed by G. B. Burchell, president, and his son, David C. Burchell, director and general manager, Four Star is the newest major operation in Nova Scotia, having begun producing in 1949. The operation serves the steam and domestic markets, with emphasis on slack for power-plant use. The larger coal sizes—lump, nut and stoker—are supplied, in season, to home owners.

The Four Star property was originally owned by a British corporation, which started and gave up development around the turn of the century. Four Star purchased the holdings in 1947, and started mining by hand and with duckbill. The first continuous miner, a Joy 3JCM unit, was installed Jan. 4, 1956, and was followed by a Wilcox auger-head unit Sept. 15, 1957.

Production comes from the Tracy seam, which dips an average of 19.6% almost directly north. Full seam thickness averages 72 in, but mining is limited to the upper portion because of bands and partings in the lower. Total thickness of the upper coal bench is 48 in. Only 45 in is mined and the remainder is left down as a floor, since the next member down is 1½ in of shale followed by 3 in of coal, 3 in of soft fireclay, 11 in of coal and 6 in of fireclay lying on a sandstone bottom.

Immediately over the top bench is 3 in of bone, followed by the main roof member, consisting of up to 20 ft of shale with an irregular cleavage. Softness and weakness in spots, in addition to the cleavage, require frequent stops to advance bolts and timbers in working places. In permanent openings, steel crossbars are necessary to assure adequate support of the roof for the requisite period of time.



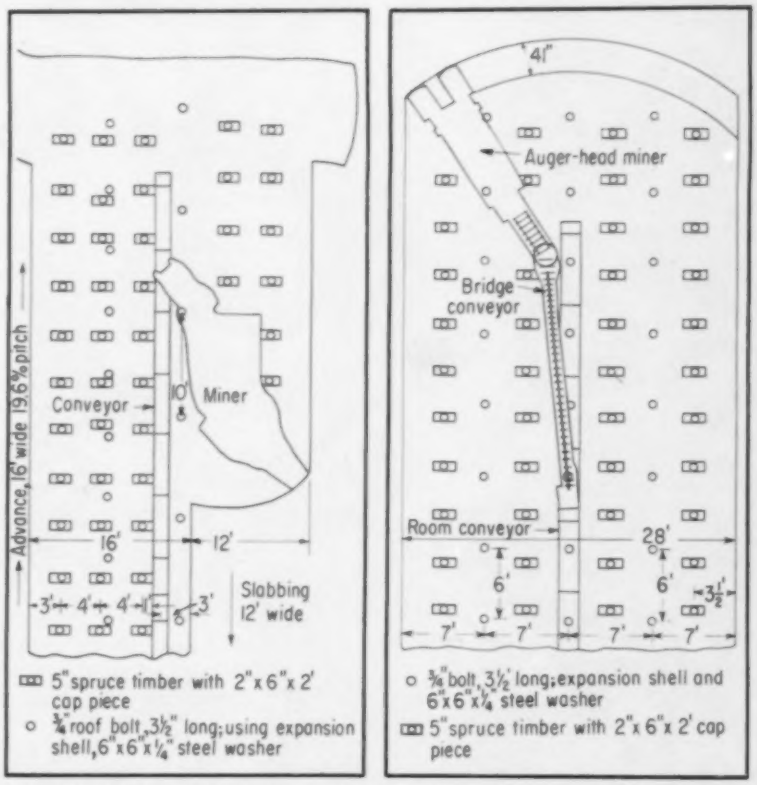
TRANSPORTATION SYSTEM in present level employs room conveyors, bridge conveyors, transfer units and subheading belts down the pitch, with main belt on the level. Headings are advanced as needed with hand loading onto shakers.

Four Star Development

The main opening at Four Star is a three-heading slope driven directly north down the full pitch. Present length is approximately 2,600 ft. Three 30-in-wide 750-ft-long Hugh Wood belt conveyors with 40-hp drives are installed to hoist the coal, and a fourth was being added at the time the material was gathered for this report.

Working levels are turned right and left off the slopes. Normally only one level is active at any one time, and mining is done on the advance. The present working level, under approximately 500 ft of cover, is expected to extend 5,000 ft. Two headings are driven per level and, as the accompanying plans indicate, rooms are worked on both sides simultaneously.

Headings are advanced 14 ft wide on 60-ft centers at an angle providing an average grade of ½% back to the slope for natural drainage. Hand-loaded shaker conveyors are used in heading work, and headings normally are kept not more than 300 to 500 ft ahead of room work. Otherwise, roof trouble is likely to be encountered. Rooms are necked as the headings are driven.



ROOF SUPPORT, reflecting top weakness, involves both posts and bolts, each installed during the cycle. Plan at left is for ripper-type miner slabbing one rib on the retreat; right, plan for auger-head machine.

Ripper Mining

As a result of the evolution in technique at Four Star, the 3JCM miner is now employed in driving rooms up the pitch from the levels and then slabbing to final width on the return, as shown in the accompanying plan. Rooms are turned on 40-ft centers and, as previously noted, are necked as the level headings are advanced. The miner cuts 16 ft wide on the advance up the pitch. Room depth is 300 ft.

The miner discharges to a Long

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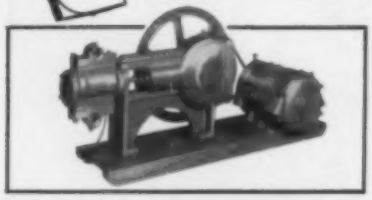
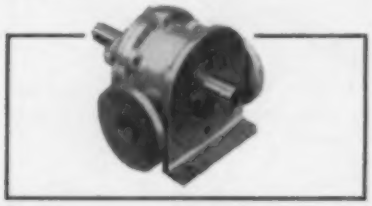


Gathering Type PLUNGER PUMP—dependable, light, compact. Has many uses. Pipe connections are brought into proper position by reversing suction and discharge chambers. 42" long, 17" wide, 22" high, weight (less motor) 260 pounds.



High Pressure SPRAY or FIRE PUMP—round stainless steel rollers prevent clogging and jamming by coal and dirt particles. Uses less power—friction is reduced. Produced in various capacities—10 GPM at 100-125 PSI for spraying. 50 GPM at 50 PSI for fire needs.

CENTRIFUGAL PUMPS highly rated for complete reliability and service. All sizes to 8" discharge and 1500 GPM. In acid-resisting bronze or stainless steel.

PUMP REPLACEMENT PARTS for practically all types and makes of centrifugal and plunger pumps.

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400 RS room conveyor, and a Piggyback unit is employed between miner and conveyor at times. When the room reaches 360 ft, the miner turns and takes a slab of approximately 12 ft on solid side on the way out of the place. It also advances the crosscuts on the solid side to a depth sufficient so that the machine cuts into them automatically in driving the next place ahead. Conveyor pans are stored in these crosscut pockets. Moving the 400 RS drive to the next place takes 2 to 3 hr, using the entire miner crew.

Five men make up the crew for the 3 JCM unit, as follows: operator and helper, faceman (cleaning up loose coal), supplyman (also functioning as timberman), and boss. All members of the crew, however, work as a group or as otherwise necessary in such activities as timbering and bolting.

The character of the roof is such that the machine can advance only 6 ft between stops for installing roof support. At each such 6-ft advance, a center bolt 3½ ft long—the maximum permitted by seam thickness—is installed using a Siemens-Schuckert post-mounted electric-auger bolting machine. Bolts are of the expansion-shell type. Three rows of posts also are carried on the advance, and these are extended immediately behind the miner.

The final support step is installing a row of bolts along the rib on the solid side in anticipation of the final slabbing operation. These bolts are installed by the third-shift crew. They are supplemented by two rows of posts set behind the miner as it cuts the slab. In spite of these interruptions, the miner normally can complete a 360-ft room.

Auger-Head Mining

The fixed height of the ripper-type machine occasionally resulted in difficulty when clearance was reduced, in addition to the fact that cut width has a definite limit. For these and other reasons, it was felt that a different type of unit might be more flexible and less subject to height and width limitations. As a result of study of the alternative types, it was decided to install a Wilcox miner as the second unit. With some modifications, it has provided the flexibility and other features management desired to better meet Four Star conditions, even though it is less maneuverable and requires more time to move to a new place.

A modified "continuous-room" plan was developed for the Wilcox unit, which works on the opposite, or downpitch, side of the level from the ripper machine. As shown in the accompanying plan of the level, rooms for the Wilcox miner are driven across the pitch parallel to the headings. These rooms are turned from subheadings driven down the pitch far enough to permit opening six rooms. Room width is 28 ft, and depth is 250 ft.

Each room is equipped with a 400 RS chain conveyor and bridge unit. The chain unit discharges to a Four Star belt in the subheading, which in turn feeds the coal to the Goodman main belt in the level heading.

The six rooms off each subheading are worked in order from No. 1 to No. 6 down the pitch. They are driven far enough beyond the 250-ft mark so that room is available for new setups when the next subheading is driven for advancing a new group. In other words, a new subheading is made every 250 ft.

Moves from one room to the next down the pitch usually require 8 to 12 hr of work by the five-man crew, with duties the same as the crew on the ripper unit. The conveyor drive is skidded and the pans are disconnected and stored in the blind crosscuts where they can be picked up as the next place advances. Clearance makes the miner the most difficult of the items to move. Dismantling and moving starts anytime a place is completed, and if it should be at or near the end of the second shift the third-shift crew will take over.

The extra width of the place results in a different support plan with the Wilcox miner, as indicated in the accompanying diagram. Three rows of bolts and four rows of posts are used in the 28-ft-wide places. As soon as the machine moves across far enough a bolt is installed at the face 7 ft from the center line and 6 ft ahead of the previous bolt, and then the posts are brought up. A second bolt is installed on the center line and a third 7 ft to the left, in each instance followed by extension of the post rows.

Normally, including stops for bolting and posting, the Wilcox miner completes a place 28 ft wide and 250 ft deep in 13 shifts.

The Big Haul. Overburden disappears fast when this big dragline excavator swings into action. Here the 22-yd bucket has just taken a large mouthful as it thins down the layer of earth above the coal seam.

For this surface job in Pennsylvania's anthracite country, the stripping contractor used Bethlehem Type U dragline ropes. Type U has husky outer wires and is highly resistant to abrasion, especially when furnished lang lay. Even when dragged for long periods over hard earth and abrasive rocks, it's a mighty tough rope to wear out.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

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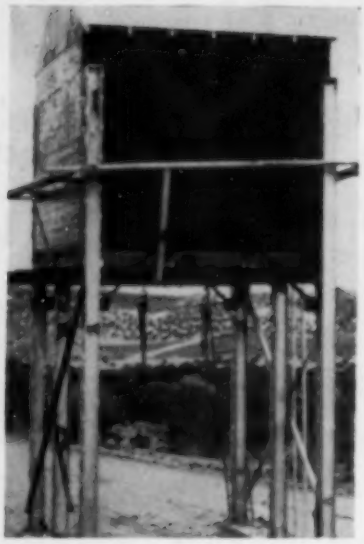
BETTER HANDLING and loading of nitrate-oil mixture is achieved with bulk loader dubbed the "Bandut".



BIN stores 36 tons of nitrate, has butterfly valves for fast loading of "Bandut".

Ammonium Nitrate and Its Use As a Blasting Agent

Efficient handling and loading of ammonium nitrate-type blasting agent cuts costs at western open-pit mines.

BLOW CHARGING simplifies loading of holes angled 45 deg with horizontal at western copper mine.

CHARGING DEVICE moves treated nitrate at the rate of 100 lb in 100 sec.

MECHANICAL MIXING of nitrate and oil before gravity loading is achieved with aid of electrical controls.

By **Donald M. Stromquist**
Technical Representative
Coal Chemical Sales Div.
U. S. Steel Corp.

AFTER THE FIRST SAVINGS have been realized from use of ammonium nitrate, large and small operators alike have been searching to get the last squeal out, so to speak, and have come up with ammonium-nitrate handling procedures that do just that —cut handling costs and obtain increased efficiency from the material used because of thorough contact with hydrocarbon, in addition to quick, safe borehole loading.

Bulk Vertical Loading

At Cedar City, Utah, Utah Construction Co. recently became interested in more efficient handling and loading of ammonium nitrate and a hydrocarbon that it uses for stripping waste and mining ore in its open-pit operations at this location. Utah Construction's thinking resulted in the construction of a bulk ammonium nitrate and hydrocarbon loader that was affectionately dubbed the "Bandut" ("Bulk Ammonium Nitrate Dispenser by Utah").

The loader consists of a steel storage box, hoist, air compressor, oil storage tank, and a measuring dispenser all mounted on a flat-bed truck. The hopper holds approximately 2.8 tons of bulk ammonium nitrate. Utah Construction currently fills the truck with bagged material but soon will realize a further economic advantage by putting a bulk storage bin into service. This bin is still under construction and was fabricated for the most part from on-hand material. The container itself will hold about 36 tons.

This bin will receive bulk ammonium nitrate shipments and the nitrate will be transferred from the bulk truck to the inside of the bulk storage bin through a top opening. Two discharge spouts at the bottom of the bin, complete with butterfly valves, will be utilized for quick gravity loading of the "Bandut". The two chain falls at the bottom of the bin are located so they can grasp and store the "Bandut" in a protected position and thus free the flat bed truck during nonloading periods for other duties.

An air motor run by the compressor and a winch in the fore end of the truck is used for tilting the hopper to permit the nitrate to gravity feed from the hopper through the gate into the 300-lb-capacity measuring container at the back end of the truck. From the measuring container, the nitrate is admitted to the borehole by opening a butterfly valve in a 6-in drain pipe.

Actuation of this manually operated valve also operates a snap valve on an oil line through a mechanical linkage to spray a metered quantity of oil through a nozzle in the drain pipe onto the nitrate as it falls through the pipe. A cone also was installed to force the nitrate to fall through a 1¼-in annular space at the periphery of the pipe. The oil nozzle was placed at the bottom of the cone and sprays an atomized oil stream at 100 psi down on the falling nitrate. An excellent 6% oil-94% ammonium-nitrate mixture is obtained at all times. By using such a bulk loader, a borehole can be completely loaded with 200 to 300 lb of nitrate mixed with oil in 20 sec.

Mechanical Mixing and Loading

One of United States Steel Corp.'s own divisions, Michigan Limestone Div., Rogers City, Mich., adopted ammonium nitrate several years ago and has been one of the long-term users. After some time, Michigan Limestone recognized the need for insuring a proper hydrocarbon-nitrate mixture as well as the necessity for realizing every possible cost advantage by developing a handling system that would reduce the manpower requirements of the loading crews.

The truck is a 3-ton unit equipped with fuel-oil tank and an air compressor. It is used for transporting the nitrate, mixing it with oil, and delivering it to the borehole by gravity through a hopper and pipe. The nitrate flow out of the hopper is controlled and as it strikes the gate flow controller, electrically operated relays open a solenoid valve on the oil line that delivers the oil under pressure through six spray nozzles located around the nitrate discharge pipe.

The proper mixture of oil and nitrate is obtained by controlling the gravity flow of the nitrate out of the hopper and by metering the oil as it is sprayed into the falling nitrate stream. Use of this truck loader, for which Michigan Limestone is processing patent coverage, has enabled this firm to cut loading crew requirements from 11 to 6 men. The operators are obtaining maximum use of manpower, are loading the holes more quickly, and are obtaining a uniform oil-ammonium nitrate mixture that insures maximum utilization of its blasting properties.

Adapted from a paper delivered at the Rocky Mountain Coal Mining Institute.

What ammonium nitrate is, how it is made and how it is converted into a blasting agent

Fertilizer-grade ammonium nitrate is a compound of nitrogen, hydrogen and oxygen (NH_4NO_3) and as such is a powerful oxidizing agent. Most of the ammonium nitrate used today for compounding a blasting agent is made by combining nitric acid and anhydrous ammonia to form a solution of ammonium nitrate. This solution is concentrated by evaporation to the point where it will solidify immediately when cooled to form near-round pellets, or "prills," when the hot ammonium nitrate solution is sprayed from the top of a tall enclosed structure called a prilling tower. The prills thus formed are dried, cooled and coated, generally with diatomaceous earth, which aids in preventing the hygroscopic ammonium nitrate from caking due to absorption of ambient moisture by the material.

This briefly is the story of how ammonium-nitrate prills are made. Let us now examine the methods by which the material is converted into a blasting agent.

Fertilizer grade ammonium nitrate can be made to react under elevated temperature and pressure conditions. This reaction under the most ideal conditions would yield as follows:

$2NH_4NO_3 \xrightarrow{\text{heat and pressure}} 4H_2O + 2N_2 + O_2$, with the end products, of course, being gases. The oxygen formed is readily available for a continuing reaction with a combustible material, for example a hydrocarbon such as diesel oil or fuel oil, to form $CO_2 + H_2O$ (gases again). Since this detonation is substantially a surface reaction it is easy to see that it is advisable to obtain a homogeneous mixture of the ammonium nitrate and the hydrocarbon employed to effectively strike an oxygen balance in the ammonium nitrate-hydrocarbon mixture and thus gain maximum detonating power for the minimum possible expenditure.

Operations using ammonium nitrate vary a great deal from one location to another but some generalities can be itemized. Most users begin by using the same powder factor, i.e., amount of nitrate-carbon mixture per ton of material to be broken and the same drilling patterns. Some operators report that they have been able to increase their hole spacing by using ammonium-nitrate prills.

Hydrocarbons used as sensitizers vary greatly, but it is safe to say that diesel oil or fuel oil are predominately used, and in the weight ratio of 94% ammonium nitrate to 6% hydrocarbon, which is the oxygen-balanced mixture. The hydrocarbon is often added directly to nitrate in the opened bag and allowed to percolate down through the material or is added by other methods discussed specifically in the accompanying material. Regardless of the sensitizing procedure used, the ammonium nitrate-hydrocarbon mixture must be treated, stored and handled as an explosive. In addition, it is wise to dispose of the empty ammonium-nitrate bags daily by burning.

Some operators pour the dry nitrate into the borehole and then add the oil, but there is good likelihood that oil added by this method can be easily lost due to seepage into the area around the borehole and may never contact portions of the ammonium nitrate at all. In any event, boreholes varying in diameter from 2 to 12 in are now being shot successfully at numerous locations.

Prior to introduction of the oil-ammonium nitrate mixture into the borehole it is necessary that a primer be inserted. The majority of the operators bottom prime with dynamite or other selected high explosives, although other priming locations in the hole are frequently used. The amount of primer used varies considerably, with some operators successfully detonating a hole with one stick of 1½x8-in gelatin, while others use 5 lb of a similar explosive per hole and yet others standardize on 5% of the ammonium nitrate weight in conventional explosives. Primers and quantities used seem to be a matter of personal preference at each location.

Electric blasting caps and detonating fuse are both widely used for primer detonation and, of course, it is advisable to use stemming. Delays can be incorporated as warranted. It has been reported by several operators that they receive better performance if the ammonium nitrate is mixed with oil and allowed to stand 24 to 72 hr or even longer. If better results are actually observed under these conditions, it must be due to superior oil or hydrocarbon penetration and mixing over such a protracted period.

Blow Charging

Another western mining concern solved the ammonium nitrate handling problem a different way. In this operation, 3-in-diameter toe holes are drilled at about a 45-deg angle to the horizontal and these holes are "sprung," or chambered, with conventional explosives. It was difficult and time-consuming to load any type of explosive into such a small hole in a satisfactory manner. As soon as these operators started using ammonium nitrate, they developed an air-loading procedure that is excellent for their purposes and would be for any other operator interested in moving and loading ammonium nitrate pneumatically.

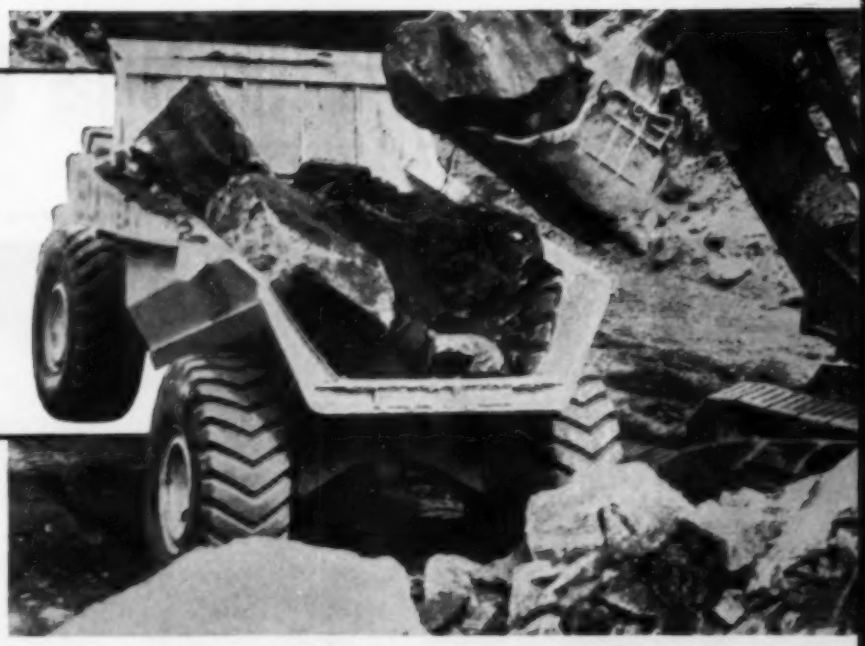
Dry ammonium nitrate is first poured into the top storage hopper from which it is let into the air tank by means of a bell valve. From the lower tank, the ammonium nitrate is partially pushed by air and partially by gravity into an air venturi at the bottom which moves it into a rubber hose by the use of 35 psi air pressure. At the same time the nitrate starts to flow a metered quantity of oil is forced by air and a floating piston through an adjacent hose to a junction point where the dry prilled ammonium nitrate and atomized oil meet immediately ahead of the borehole. At this point the nitrate and oil combine and the mixture is driven through a pipe into the borehole until it is loaded with the proper amount of the explosive ingredients.

An excellent oil-ammonium nitrate mix is obtained, in large part due to excellent oil atomization. This ingenious loader mounted on a truck has enabled this western copper-mining concern to move nitrate properly treated with oil into its holes at the rate of 100 lb in 100 sec.

These are surely not all of the methods used to handle ammonium nitrate efficiently, but they represent a step in the right direction. Other developments, such as, refinements in bulk handling, use of ammonium nitrate in wet holes and in approved underground locations, to mention a few, will result in further cost reductions for the cost-conscious mining industry.

Load-out more per shovel

In the loading zone, Tournapull® Rear-Dumps reduce shovel waiting, cut load-time . . . handle more loads per day



You'll load-out more per day, when your shovels load into LeTourneau-Westinghouse Tournapull Rear-Dumps. These husky haulers speed your load-haul-dump-return cycle in many ways. Here's how Tournapulls boost output by saving time *in the loading zone.*

Faster spotting at shovel

Rear-Dump eliminates slow back-and-forth maneuvering to spot, while your shovel sits idle and waiting. Tournapull operator can swing prime-mover 90° . . . make sharp turns to maneuver quickly into best loading position. Tournapull's quick maneuverability adds time for extra payloads . . . saves preparation of turn-arounds . . . shortens cycle.

Turns 180° in tight quarters

With 90°-turn, geared electric-steer on kingpin, your Tournapull operator can make fast, tight U-turns at the shovel . . . in dead-end cuts, in narrow pits, in tunnels, on restricted benches. This frequently saves long, slow back-in . . . eliminates delays for shuttling into tight positions. A 22-ton model "C", for example, can turn 180° to spot in a dead-end cut less than 21′ wide. All L-W haulers make continuous U-turns in less than their own length. And with body "up", they can turn 180° in 25% less than their length.

Big, easier-loading bowl

Rear-Dump's broad bowl is an easy-to-hit target — one that lets your shovel operator spot dipper fast, for quick dump without spillage. He swings the bucket thru bowl's low rear entry in a smooth, continuous arc . . . there's no time wasted on jerky up-down-up-and-out motions.

Exclusive . . . Tournapull steering

Only Tournapulls give you geared, electric-powered, 90° kingpin steer. At touch of a dashboard switch (or movement of steering wheel on 35-ton unit), an electric motor pivots prime-mover on the kingpin. Safety limit switch stops turn at 90° angle.

The rugged triple-strong body is so tapered that it takes shock loads easily, quickly builds a protective bottom load cushion. Because long drive-shaft is eliminated, unit also gives you an exceptionally low center of gravity for safe, fast hauling.

Steady, low-cost earthmoving

Tournapull Rear-Dumps take on full payloads fast, maneuver easily, haul steadily on or off roads, and dump clean in seconds. They're easy to operate and extra safe on soft fills and over-bank dumps . . . on steep hills . . . on narrow, winding roads. Tournapull's simple construction cuts maintenance downtime, reduces cost per ton.

Get all the story . . . it's important to you! Call or write for complete details on Tournapull Rear-Dumps.

R-1461-DC-1

Three profit-building sizes

	Model B	Model C	Model D
Ton Capacity...	35 net tons	22 net tons	11 net tons
Bulk Capacity.. (heaped 1:1)	31 cu. yds.	22 cu. yds.	10.5 cu. yds.
with tailgate	33 cu. yds.	24 cu. yds.	11 cu. yds.
with sideboards ...	not offered	28 cu. yds.	not offered
with tailgate and sideboards ...	not offered	29 cu. yds.	not offered

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Big Paul digs and dumps

79-yard dipper and handle, crowd rack, ball and sheave blocks—all built stronger and lighter with USS "T-1" Steel.

105 tons in 50 seconds!

USS "T-1" and TRI-TEN Steels cut dead weight—boost strength

Big Paul, the King of Spades, is another of the world's biggest shovels. There are three of these 70-yard giants—all were built by Marion Power Shovel Company. All achieve strength and toughness with least weight by the use of USS "T-1" Constructional Alloy Steel and USS TRI-TEN high-strength low-alloy steel.

Big Paul sets the pace at the Peabody Coal Company's River King mine near Freeburg, Illinois. It rams through rock and shale to uncover some two million tons of coal per year.

Since 1950, the art of big shovel making has increased dipper size from 35 to 45, 55, 60, and now 70 cubic yards per bite. Most of these giant dippers are made entirely of USS "T-1" Steel, for it would be almost impossible to make them light enough and tough enough, otherwise. They hold up in this service, taking terrific impact abrasion and shock loading, even in the dead of winter. This is because USS "T-1" Steel retains its amazing toughness at temperatures far below zero.

USS "T-1" Steel has often enabled a boost in the capacity of original equipment without increasing size or weight. For example, a 20-yard bucket was replaced with a 24-yard "T-1" job. Other dippers were boosted from 26 yards to 32; and 36 yards to 45—increases of 25%.

Many other parts—dipper stick, bail handle and crowd rack—are built stronger and lighter with this 90,000 psi minimum yield strength constructional alloy steel. (USS "T-1" Steel plates are now available with a minimum Y.S. of 100,000 psi.)

The booms and A-frames of most shovels over 45 yards are designed with high-strength low-alloy steels with 50,000 psi minimum yield point . . . usually USS TRI-TEN Steel.

Boom crowd handle and welded A-frame are made of USS TRI-TEN high-strength low-alloy steel.

Perhaps you need a steel that offers higher strength, extraordinary toughness and resistance to impact abrasion, combined with ease of fabrication. USS "T-1" Steel is your answer, and we'll gladly help you adapt it to your application. For free booklet, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, "T-1" and Tri-Ten are registered trademarks

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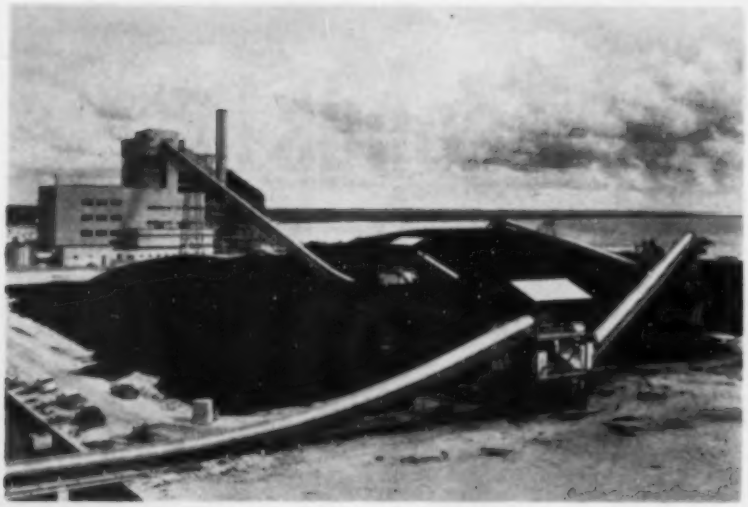
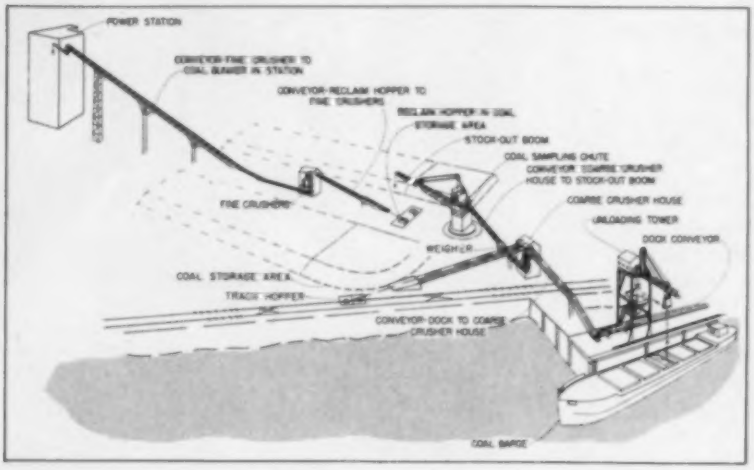


WATER-BORNE COAL fuels new Gannon station of the Tampa Electric Co., with provision for receipt by rail when warranted. Normal coal source is western Kentucky with transport by river and seagoing barges.



Tampa Electric Chooses Coal

Coal figured in the earliest planning for Unit No. 1 of new Gannon station at Tampa, Fla., with a gross capability of 135,000 kw. Normal supply is by barge from western Kentucky, with provision for rail receipt when warranted. Two additional units will add 321,000 kw in gross capability by late 1960.

By A. D. Jones
Mechanical Engineer, Tampa Electric Co., Tampa, Fla.
And W. E. Hopkins
Mechanical Engineer, Stone & Webster Engineering Corp., Boston, Mass.

THE FEASIBILITY of using coal was considered from the earliest stages of planning for Unit No. 1 of the new Gannon station of Tampa Electric Co. This modern power station not only embodies design features new to the area, but is of a size and design which might be applicable at various other locations in the region. Primarily, however, it represents a moderately lower investment for a modern coal-burning station on a new site.

Growth the Key

In 1947 Tampa Electric Co. had one steam-electric generating station with a 65,000-kw capability. Today the company has three stations with a total load-carrying capability of about 430,000 kw, an increase of 562% in 10 yr. This means a growth rate, compounded, of 20% annually in the Tampa area, compared to 9% for the U. S.

The latest unit to go into service is Unit No. 1 at the Gannon station. Its expected output is 128,000 kw. Unit No. 2 is under construction and is expected to go into operation soon with an output of 130,000 kw. Unit No. 3, the final one in this program, is scheduled for operation in late 1960 with an expected output of 173,000 kw.

The completion of these units will bring the load-carrying capability of the system up to about 733,000 kw, an increase of over 1,000% in 13 yr. This rapid growth is occurring in an area of about 1,700 sq mi containing 10% of Florida's population and 3% of its area.

How Coal Was Chosen

From the earliest stages of planning for the No. 1 unit at Gannon station, coal was, as noted, considered as the fuel. However, initial investigations appeared to indicate that it would not be the most economical, and consequently an oil-fired boiler was ordered.

Shortly afterward, a coal-company representative visited the management of Tampa Electric to determine the conditions under which coal could be used. He discussed price, delivery and contract length with Tampa Electric executives and it was agreed that new economic studies would be made.

These studies, which involved, in addition to the coal company, the

utility, Babcock & Wilcox Co. and Stone & Webster Engineering Corp., lasted several weeks. The results indicated that using coal at the Gannon station would be economically advantageous. Changes in boiler design were negotiated, and the plant design then proceeded on the basis of coal as the primary fuel, with provisions for possible future use of oil or gas.

Coal Contract Signed

A 20-yr contract for coal delivery with provisions for limited price adjustment was signed. The coal was to come from western Kentucky and was to be moved by barge down the Ohio and Mississippi rivers to a coal terminal near New Orleans. From there it was to be transferred to ocean-going barges and towed across the Gulf of Mexico to Tampa Bay and the unloading dock at Gannon station.

Subsequent developments made it necessary to obtain some coal by rail from other sources in addition to the original. As a result, permanent full-capacity rail unloading facilities were provided at the station. More recently, a new source of water-borne coal has been obtained—the mines of Peabody Coal Co., also in western Kentucky.

How Barge Coal Is Handled

Coal handling at Gannon station is divided into two distinct operations, the first to meet the requirements of coal receipt and storage, and the second to supply the station itself.

Coal received by barge is unloaded by a traveling clamshell-bucket unloading tower, which feeds a belt conveyor (see diagram). The conveyor transports the barge coal to the coarse crushing house. After crushing, the coal is weighed and sampled and then is taken to a distribution center. From there the coal goes either to two reclaim hoppers at ground level for immediate use, or to a rotating boom-type conveyor which distributes it on top of a 30-ft-high permanent storage pile.

Bulldozers then further distribute the storage-pile coal over a larger area with a minimum of uphill movements. The storage area under the limits of travel of the rotating boom conveyor is large enough to permit complete unloading of the largest expected coal shipment at any time without requiring bulldozer operation or direct distribution into the reclaim hoppers. The storage pile is arranged for separate storage of coal obtained from different sources.

Handling Railroad Coal

Coal received by rail is unloaded into a single two-compartment track hopper at 500 tph with the aid of a vibrating car shaker. From the track hopper it is transported by belt conveyor to the coarse crushing house. After crushing, railroad coal is handled by the same system as the barge coal.

The weighing, sampling and coarse crushing facilities serve for both barge and rail coal receipts.

The conveying system transporting coal from the unloading tower to the storage area is equipped with two-speed drive machinery, permitting handling of 500 tph initially, and 1,000 tph ultimately if a second unloading tower is installed. Future installation of a second duplicate track hopper will provide a maximum rail unloading rate of 1,000 tph.

Plant Coal Flow

Coal for station use is reclaimed from yard storage through the two reclaim hoppers located below the discharge of the boom conveyor. Approximately 5,000 tons of the coal distributed over the reclaim hoppers by the boom conveyor is reclaimable by gravity without the help of bulldozing equipment.

A 36-in belt conveyor transports coal from the reclaim hoppers to the fine crushers for reduction to the size required by the plant's cyclone burners. From the fine crushers the coal travels to the station bunkers.

Initially, a single conveyor and two fine crushers have been provided to handle 500 tph, but duplicate crushers and conveyors can be added to increase the handling rate of 1,000 tph. No coal crushing will be performed within the power station.

Design of the plant provides for yard storage of 400,000 tons of coal at a median depth of 40 ft. In addition, space has been reserved for possible future storage of fuel oil.

The climate permits placing the coal bunker outdoors, reducing building enclosure needs and ventilation requirements, and lowering explosion hazards. The absence of frozen coal in the cars and the generally favorable weather permit unloading rail coal on a one-shift schedule.

Plant-Design Highlights

The plant was designed to provide a balance between reliability, investment cost and operating costs, which reflect fuel price, thermal economy, maintenance and operating labor. The increased reliability of modern units made possible design economies such as the outdoor installation of much equipment.

The steam generators for Unit No. 1 and No. 2 are identical, each having a pressurized furnace and three cyclone burners arranged in a single row. The cyclone burners are of the vortex type with coal feed entering at the center of the burners from three belt-conveyor-type coal feeders.

The furnace heat release rate is 85,800 Btu per sq ft per hr. The boilers are designed for an output of $1{,}107.7 \times 10^6$ Btu per hr, equivalent to a total steam flow of 950,000 lb per hr from the superheater outlet at 1,580 psi gage and 1,000 F and a flow of 839,000 lb per hr from the reheater outlet at 470 psi gage and 1,000 F.

It is expected that the limiting factor in boiler performance will be tube-metal temperatures. Constant steam temperature is maintained by a combination of flue-gas recirculation and spray attemperation down to a steam generation of about 550,000 lb per hr.

Since Tampa is a clean area with many light-colored buildings it was important that the burning of coal should not result in the discharge of more ash to the atmosphere than would occur with oil firing. This has been accomplished by installation of electrostatic precipitators with continuous rapping.

Plant expansion by addition of future units is provided for by having the coal conveyor enter the permanent end of the building, thereby permitting the building to "grow" larger in one direction.

Slag from the furnaces is collected in a hopper and pumped to a dewatering bin which discharges to trucks or railroad cars. Arrangements are being made for sale of the slag as discharged from the bin at approximately 90c per ton. In addition, dry fly ash collected in the electrostatic precipitator may be sold.

Allis-Chalmers TS-160

7 yd struck

9.5 yd heaped

155 horsepower

5 speeds to 25.4 mph

12-ton payload

Measure these advantages for

22 hp per struck yard—Big Allis-Chalmers supercharged diesel engine delivers extra lugging ability for tough pulls, fast loading. Versatile TS-160 can team up with big equipment or work alone on long- or short-haul construction jobs—handle a wide range of utility jobs, travel at speeds up to 25.4 mph.

Measure these features . . . Allis-Chalmers 516-cu-in. diesel engine—dependable power at all working speeds • Independent, constant live hydraulic power for steering and scraper operation • Low, wide bowl—8-ft, 1½-in. cutting edge . . . 3-piece, interchangeable cutting edges . . . double-acting hydraulic bowl lift jacks • Positive hydraulic ejection, high apron lift to full 7-ft, 1½-in. opening • Roomy operator's compartment, easy-to-reach controls, 24-volt direct electric starting, adjustable bucket-type seat, synchronized 4-wheel air brakes • Big push block for all types of pushers.

a wide range of earth-moving jobs...

Turns non-stop in less than 25 ft with 90-degree hydraulic steering . . . easy maneuverability in narrow cuts, faster cycles without reversing in tight turn-arounds.

Moves quickly from job to job . . . when required, transport wheels are available to meet legal load limits for highway travel.

ALLIS-CHALMERS CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

INDUSTRY MEETING—A Special COAL AGE Staff-Written Report

TECHNICAL SESSION—J. W. Hunt (left), Penn State; John Adams, Mountaineer Coal Co.; A. C. Lordi, Westinghouse Electric Corp.; Frank Scott, USBM; and Frank R. Hugus and James W. Woolf, Joy Mfg. Co.

Maintenance Group Holds Summit Meeting

High-level talks on AC power, diesel haulage, methane-monitoring and announcement of Branch and Maintenance Man of Year awards highlight annual ME-MMA meeting.

THE MINING ELECTRO-MECHANICAL MAINTENANCE ASSOCIATION marked its 10th anniversary at its annual meeting at the Summit Hotel, Uniontown, Pa., Sept. 27. Attending were 337 electrical and mechanical experts, supervisors and manufacturer's representatives.

J. W. Hunt, associate professor, Pennsylvania State University, presided at the afternoon technical session. Robert A. Huth, Universal Welding & Metals, Inc., presided for the evening program which included the President's address, presentation of Branch Award and Maintenance Man of the Year Award and a talk on "Some Impressions of Russia," by H. M. Blackmon, engineering manager of association activities, Westinghouse Electric Corp.

Myles E. Altimus Jr., president of ME-MMA and training supervisor, U. S. Steel, discussed ME-MMA's growth and noted that no other organization in the industry has expanded so rapidly. He pointed out that in 1948 ME-MMA consisted of four branches and had 20 participating member organizations compared to 11 branches and 112 member organizations today. As for ME-MMA's future, he noted that recent requests for information from Virginia, Utah, New Mexico, West Virginia, Tennessee and Kentucky point to even greater expansion. Mr. Altimus concluded his address by stating that "ME-MMA can expect to double in size within the next 10 yr."

Winners of the Branch Award and the Maintenance Man of the Year Award were announced at the banquet. The Branch Award was won by the Greensburg-Irwin Branch for the most outstanding advancement in the past year.

The Maintenance Man of the Year Award was won by W. E. McClain, senior maintenance engineer, Frick district, U. S. Steel. Mr. McClain won in competition with entrants from two other branches. Modifications of the hydraulic system of a continuous mining machine, which eliminated eight gears, seven idler shafts, 14 bearings and four packing glands, and reduced oil consumption by 40% and replacement of parts by 10%, and provided substantial savings as a result of reduced machine downtime and labor netted the award for Mr. McClain.

Runners-up were J. H. Newcomer, master mechanic, Bird Coal Co., and Daniel R. Stewart, preparation engineer, Mountaineer Coal Co. Mr. Newcomer's contribution was elimination of fire hazards on the 70 Colmol by removing all the wires from the bumper, hydraulic system and control valve. Mr. Stewart designed a stationary feed distributor for use with Deister Concentrator table. Maintenance cost on the unit is negligible and performance is at least equal to the rotating type. Total cost of the stationary type is $600 compared to $4,500 for the rotating type.

Following are abstracts of the technical papers.

Power Distribution for AC Mines, by A. C. Lordi, mining industry engineer, Westinghouse Electric Corp.

As mechanization increases, so do both the magnitude and concentration of electrical loads. Thus, it becomes more and more important that we carefully examine the power system so that electrical energy can satisfactorily power mining machinery.

The major items of electrical apparatus involved are:

1. Surface substation.
2. Portable switchhouses.
3. Underground power centers.
4. Low-voltage distribution centers.
5. Underground capacitor packs.

The prime considerations in the choice of electrical apparatus to perform these functions are safety, voltage regulation, reliability and cost.

Continuous satisfactory operation of underground mines depends upon the power distribution system. A careful selection of the distribution apparatus is an economic necessity. The small additional expense for the safety features available, the margin of capacity and the good voltage regulation designed into the distribution system is easily justified by safer, more dependable equipment performance.

Maintenance Experience at a Mine Using AC Power, by George L. Judy, vice president, Mountaineer Coal Co. (read by John Adams, industrial engineer).

The trend toward AC power installations in our coal mines has already developed and should accelerate considerably in the near future. We have recognized that AC in the face region is a necessary link to obtain higher tonnage capacities with continuous mining machines.

Factual data regarding maintenance with AC powered equipment is derived from an AC section using conventional mining equipment and another section using continuous miners.

Production experience on the AC conventional section has been satisfactory.

BRANCH AWARD to Greensburg-Irwin group, is presented to H. L. "Hank" Sowers, Delmont Fuel Co., by R. A. Huth, Universal Welding & Metals, Inc.

MAINTENANCE MAN AWARD is presented to W. E. McClain (left), senior maintenance engineer, U. S. Steel, by Frank Burns, Crucible Steel.

Even though initial mining followed off-standard projections, performance data were equal to a DC-equipped section similarly operated for comparative analysis. Data taken for a 3-mo period indicated the AC section maintenance supply cost per ton to be 56% lower than the DC-equipped section. The AC section again showed the lowest cost per ton for equipment supplies when compared with all other conventionally equipped sections within this mine over a 9-mo period. The maintenance supply cost per ton was 31% lower than the composite average for the other DC units.

From the standpoint of delays, 77% of the lost time for electrical delays was charged to trailing cables.

AC power was found to be virtually trouble-free on the continuous mining section. A negligible 2 min per shift was lost because of electrical delays on all AC equipment. These data are taken from a composite average over a 167-shift recording period. The major portion of this lost time was attributed to trailing cable delays.

In summary, the future application of AC to power face equipment in underground coal mining holds much promise. Certainly the limited experiences herein described do not provide sufficient data for comparison with DC systems and equipment. However, maintenance experiences now on record indicate that complete AC power installations are economically warranted.

Underground Diesel Haulage for Non-Coal Mines, by Frank R. Hugus, chief electrical engineer, and James W. Woolf, product manager, Coal Machinery Div., Joy Mfg Co.

Why should the mining industry consider diesels for underground haulage? This question can be answered in one word—maneuverability.

The inherent advantage of the diesel is based on its heat efficiency and offers other advantages when used in confined places, such as mines.

The exhaust of any diesel engine contains toxic gases. These gases must be reduced to very low percentages, diluted and carried away if the equipment is to be considered safe for use underground. This exhaust can be controlled and treated so as to remove any objection to toxic gases and odors. The system most commonly used in the United States depends on passing the exhaust thru a chemical water bath.

As the use of diesels becomes more wide spread underground, it is obvious that an increasing amount of attention must be given to ventilating air.

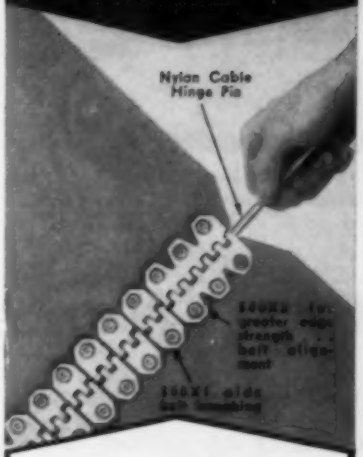
Maintenance of diesels is the same as maintenance on any other item of equipment.

Maintenance Aspects of Continuous Methane-Monitoring Systems, by R. S. James, chief, Branch of Electrical-Mechanical Testing, U. S. Bureau of Mines. (read by Frank Scott, general engineer).

The methane-monitoring system, as defined by the director, will be a detector that will be mounted on face-area mining machinery and will sample the mine atmosphere constantly while electric power is supplied to the section. This detector will be designed to give a warning, either audible or visible, when the atmosphere at the detector contains 1 to 1.5% methane. If the concentration reaches 2 or 2.5% by volume, the detector will automatically activate controls that will shut off the electrical power to the whole working section.

Along with a workable and acceptable methane-monitoring system will be new maintenance requirements, but they should be simple and as infrequent as modern design can provide. Dust filters, if necessary, will need changing. Detectors may be constructed as package units so that it will be easy to replace a worn or defective detector. Electrical controls will be designed as simply and foolproof as possible to keep the system as free of the human element as is practical for such an operation.

WHERE SPEED COUNTS... use FLEXCO HINGED 500X BELT FASTENERS



UNDERGROUND COAL MINING

THE IDEAL FASTENER FOR JOINING EXTENSION BELTS. DESIGN PERMITS THE USE OF A SMALLER FLEXIBLE NYLON CABLE HINGE PIN FOR SMOOTHER, TIGHTER JOINTS.

NYLON CABLE HINGE PIN . . .

- Easy to insert or pull out . . . will not migrate.
- Smooth wearing surface—nylon is self-lubricating.
- Will not unravel when cut.

Start now to equip your extension belts with FLEXCO 500X "SEPARABLE" FASTENERS (new FLEXCO HINGED 500X FASTENERS are interchangeable with old HF 500 Fasteners).

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Carton contains one complete belt joint—fasteners, pin, bolts and nuts.

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COAL TODAY—G. Don Sullivan (left), National Coal Association; R. T. Laing, secretary-treasurer, and George E. Owen, president, Central Pennsylvania Coal Producers; R. E. Lee Hall, NCA, and W. A. Fullarton, Low Volatile Coal Exports.

Coal's Market Outlook

Opportunities for coal in export and utility markets and mounting competition from Canadian gas and residual-oil imports mark the immediate future.

MARKING 40 YR OF SERVICE, the Central Pennsylvania Coal Producers' Association and the Eastern Bituminous Coal Association, meeting at Bedford, Pa., Oct. 2-3, transacted association business, elected officers for the coming year and heard outside experts analyze trends in oil and gas competition, in exports, and in electric-utility fuel use.

George E. Owen, president, Imperial Coal Corp., was re-elected president, and R. T. Laing was again chosen secretary-treasurer. Other officers are:

Vice president—Richard T. Todhunter Jr., Barnes & Tucker Co.

Assistant treasurer—C. P. O'Neill.

Counsel—Frank G. Smith.

With Messrs. Owen and Laing presiding, the open session and the annual banquet featured the following:

Present Status of Natural Gas, Robert E. Lee Hall, general counsel, National Coal Association—Good news department: Recent FCC decision denying the application for gas for the Waterside plant in New York; a second decision denying a Duke Power boiler-gas request; and the attitude of one FCC commissioner, who seems determined to conserve the supply.

Bad news department: The looming threat of gas from Canada reflecting major new discoveries; the FCC decision to eliminate the intermediate procedure step in the natural-gas case; and recent court decisions destroying the fair field price formula for gas and requiring pipeline companies to get consent of users before increasing rates. Yet some advantage may still be gained, since the decisions have highlighted the need for corrective legislation, for which coal will press in the next Congress.

Residual-Oil Imports, G. Don Sullivan, administrative assistant, National Coal Association—While Congress did not specifically restrict the importation of residual oil it did set up a precise formula for such restriction and gave the administration a mandate to put it into effect. So far, the administration has not done so, even though everything indicates the need for mandatory limits. A specific law is still needed, and the fight must be made in Congress.

The Export Market, William A. Fullarton, executive vice president, Low Volatile Coal Exports, Inc.—Time will tell whether the overseas export market can be considered permanent. A heartening development is the fact that purchases are being made with earned dollars. Prices have been relatively good, and for these and other reasons loss of the market in whole or in part would be a major blow.

Problems at this time: Political action, as in the recent German limitation move; getting U. S. dollars to make payments; and competition from other fuels. Offsetting these is ability in many instances to lay coal down cheaper than it can be produced in Europe. The metallurgical market is solid. Both immediate and long-term forecasts are difficult."

Fuel for Electric Power, A. F. Tegen, president, General Public Utilities Corp.

"1. There is no substitute for electricity on the horizon . . .

"2. It is plentiful in the U. S.

"3. Electricity can do most things better than any other fuel (including house heating and cooling).

"4. It certainly is the most convenient and cleanest form of energy and is easy and safe to use anywhere.

"5. It literally has 'a thousand and one' uses that no other fuel has (and a huge electric appliance and new electronics industry thinking up new ideas).

"6. The electric power industry doubled in size since 1950 and will double again in the next 10 yr.

"7. It has done a remarkable job in curtailing costs in spite of fuel and wage increases, but may have to seek rate increases if wage and fuel costs continue to go up.

"8. Investors in electric power company securities have fared rather well. The industry has no trouble getting additional capital.

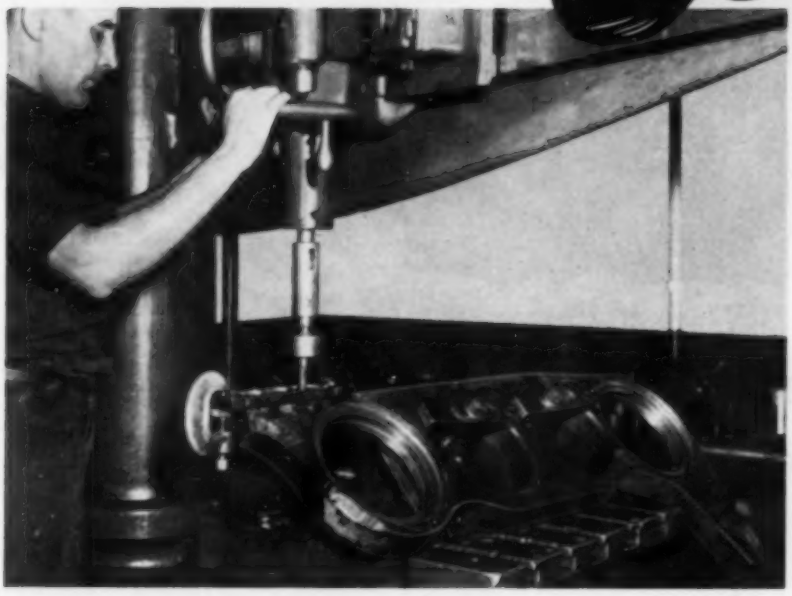
"9. Coal is king in electric power production, but the coal producers should take every step to keep it there by maintaining a competitive fuel price.

"10. Economic nuclear power is years away. If and when it does come, the electric power companies will absorb it readily. Unless the coal producers are prepared to supply all the increasing demands for energy, they should welcome the 'assist' from economic nuclear power for, when it comes, coal will still be used.

"11. New sources of electric power are likely to be developed. The sun and the sea will be diligently explored. But they, too, are even more years away.

"12. The coal producers and the electric utilities (at least in the northeast) are real partners in the vital and romantic business of supplying energy to the people. Each of us has problems to be sure. A firm resolve to solve them as they arise will enable us to maintain our position in this magnificent free economy. If we fail to solve our problems we should reconcile ourselves to the ways of the socialist state."

When Every Minute Counts...on Repair Jobs



Leman helps you reduce "downtime" . . . boosts your working profits

Leman not only restores old equipment to original condition. . .but frequently makes design improvements. As shown here . . . Leman was first to drill square holes for mounting bits directly into cutter bars . . . fewer parts required . . . repair time and costs reduced.

Every phase of Leman Service is organized to keep your equipment at top operating efficiency without extra downtime delays. Heavy mining machinery repairs by Leman can mean more production profits to you. Your equipment gets back to work faster . . . delivery is assured even on most urgent repair jobs. Immediate job site pick-up and delivery often permit repairs to be started the same day equipment needs attention. More and more, coal producers are turning to Leman for repair work. They like the valuable time savings . . . they like too, the fully qualified workmanship and economy possible with the latest assembly line techniques in Leman's completely equipped machine shop. Repairs at Leman, where all parts are electronically checked for internal stress prior to reassembly . . . cost less than in your own shop.

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LEMAN MACHINE COMPANY

How New York Central's Fuel Engineer helps customers get the most out of coal

THERE'S MUCH MORE than price to be considered in the choice of a fuel. The final cost of coal, as an industrial fuel, is dependent upon modern coal-burning equipment, operation of the equipment, selection of the best type of coal for a specific burning application.

New York Central's technically trained Coal Sales Fuel Engineer is available to aid users to get the most from their coal dollar.

Call on him for these technical services: The selection of the right coal for your particular firing job . . . proximate analysis and BTU content . . . grindability for use in pulverization equipment... fusion analysis . . . surveys on various fuel cost comparisons . . . smoke abatement control . . . ash handling problems . . . handling of frozen coal . . . stockpiling of coal.

If you burn or are contemplating burning coal as an industrial fuel, the services listed above are readily available to you. Call or write: Mr. Harry A. Klester, Fuel Engineer, Coal Sales Department, New York Central Railroad, 466 Lexington Avenue, New York 17, New York.

New York Central Railroad

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PORTABLE ECONOMICAL DURABLE...

Alcoa Aluminum Pipe for

TEMPORARY WATER SUPPLY
OR DRAINAGE
COMPRESSED AIR
STEAM . . . FUEL

Portable piping plays a major role in keeping mining operations on the move. Here's why it will pay you to specify light, strong ALCOA® Aluminum pipe for your portable piping needs:

PORTABLE . . . One man can easily handle several standard lengths of ALCOA Aluminum pipe. Small crews can quickly and easily lay long lines of pipe. Pick-up and relaying is just as easily accomplished to keep pace with moving jobs.

ECONOMICAL . . . Quick, easy handling by small crews means low laying costs. And extra long service life adds extra savings.

DURABLE . . . Rugged ALCOA Aluminum pipe stands up under heavy abuse when laid or strung from supports over or under the roughest terrain. And aluminum is highly resistant to corrosion under the most severe conditions.

Operating efficiency of ALCOA Aluminum pipe is excellent. It has the same friction factor as smooth drawn tube of other metals, insures low loss of head.

ALCOA Aluminum pipe and quick couplings of aluminum are immediately available—through a nationwide network of distributors. You'll find them listed under "Pipe" in the Yellow Pages of your telephone directory. Check your distributor for a complete list of sizes available . . . or use the handy coupon.

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Solid Fuels Meets at Hampton Roads

Joint ASME-AIME Solid Fuels Conference chooses export theme. Sessions feature talks on coal preparation, handling and utilization subjects, exports and atomic power.

HAMPTON ROADS—the Nation's coal export capital—took the spotlight as over 200 registrants gathered at the Hotel Chamberlin, Old Point Comfort, Va., Oct. 9-10, to attend the 21st Annual Solid Fuels Conference of the American Society of Mechanical Engineers and the American Institute of Mining, Metallurgical and Petroleum Engineers.

Featured at the event was a tour of Hampton Roads on the U. S. Coast Guard seagoing fleet tug, "Cherokee." The tour included a waterside look at the export coal piers of the Chesapeake & Ohio, Norfolk & Western, and Virginian railways; also, facilities of the Norfolk Naval Base, the Newport News Shipbuilding & Drydock Co., and Fort Monroe.

At the annual banquet, Elmer R. Kaiser presented the Percy Nicholls Award to Dr. Willibald Trinks, professor emeritus, Carnegie Institute of Technology. The award is presented annually for notable scientific or industrial achievement in solid fuels.

Technical and luncheon sessions covered a wide range of subjects. Of particular interest were the talks and papers abstracted as follows:

Exports

The Coal Export Market, S. Pemberton Hutchinson, General Coal Co.

Industry Meeting—
A Special COAL AGE Staff-Written Report

U. S. overseas coal shipments will drop to an estimated 40 million tons this year [down from 58 million tons in 1957]. Many factors will complicate the future export market including the current oversupply of coal in practically all Western European countries, increasing competition from other energy sources and from Polish and Russian coal, overseas political maneuvers, currency problems and barter trade. In spite of all these factors, however, U. S. coal is still needed by overseas countries and will continue as an important part of the coal business.

Nuclear Competition

Atomic Power and Solid Fuels, Theodore Baumeister, Columbia University.

As a weightless fuel in plentiful supply, atomic energy has a terrific future. But in all of its applications, the merits of using atomic energy should be weighed against alternative power sources. Nuclear power, for example, has proven its uniqueness in submarine propulsion; on the other hand, its use in automobiles is highly unlikely.

The vastness of atomic energy development has called for government aid which makes economic evaluation treacherous and difficult. Furthermore, objectives of the military, international prestige and other factors have created a mass of confusion. But these complications are no reason for allowing ourselves to be stampeded into irrational positions.

Many people, for example, want to build huge central nuclear plants but are blind to these facts: (1) No agreement has yet been reached on the best kind of reactor to build, and (2) costs are excessive—as much as 10 times higher than in conventional plants.

Nuclear power is not likely to have much impact on solid fuels for some time. Construction of large central steam plants will continue. And, although further improvements in efficiency will be difficult, investment costs will be brought down.

We will benefit most from atomic energy development by concentrating on such applications as ship propulsion, and by applying the lessons of this experience to other uses. Thus, orderly progress will be achieved and, between 1980 and 2000, nuclear power will become a competitive or supplementary fuel. There is no substitute for fearless sifting of data to provide the truth for the best applications.

Preparation

Railroad Car Dumper Coal Sampling, A. Burr, Cleveland Electric Illuminating Co., and W. R. Reichenstein, Fairfield Engineering Co.

The only sure way to obtain representative coal samples is to take them from the stream of coal as the railroad car is being dumped. Studies show that the coal stream between the railroad car and the hopper is the only point where coal is caused to flow while still retaining its mine identity. Once coal falls into the car dumper hopper, its mine identity is lost since this hopper is a common surge bin for cars previously dumped.

An appropriate system has been worked out which employs sampling tubes to tap the flow of coal as the car rotates between 90 and 150 deg from its initial position in the dumping cycle. Leading utilities have checked the car dumper method of sampling and have found that its accuracy meets with standards set by the ASTM code.

During the past 12 mo, tests and studies have been made on the application of sampling tubes on railroad high-lifts. Results so far have been gratifying and further information on this development will be presented at a later date.

FOR OUTSTANDING ACHIEVEMENT in solid fuels technology, Dr. Willibald Trinks (left), professor emeritus, Carnegie Institute of Technology, receives the Percy Nicholls Award from Elmer R. Kaiser, award committee chairman.

Drying of Fine Coal, Charles W. Gordon, Combustion Engineering, Inc.

Surface moisture is removed from fine coal by two methods: mechanical dewatering and heat drying. The most economical method of moisture removal is by mechanical methods such as centrifuges. Therefore, the maximum moisture reduction should be obtained by using mechanical methods prior to heat drying.

While the art of fine coal drying is old, the intensive application is limited to the past 12 yr. This increased interest is due to the increasing costs of mining coal, thus making it economic to recover all fines rather than wasting them to lagoons.

The demand for fine coal dryers has resulted in the development of several different types. Those in common use include the screen, cascade, flash, Parry and fluid-bed types. All dryers are a combination of the following elements: air heater, dryer, primary dry coal collecting system, secondary dust collecting system, wet scrubber, and temperature control.

The actual cost of fine coal drying is a subject of considerable controversy because various plants allocate costs differently. A painstaking study was reported by Judy and Washburn at the New Orleans meeting of the AIME in February, 1957. The table below is for flash dryers. These are typical for most all types:

Cost Per Ton of Per Cent Surface Moisture Coal

	Plant A	Plant B
Initial surface moisture	8.5%	7.5%
Final surface moisture.	2.5%	2.5%
Labor	$0.0115	$0.0257
Maintenance		
Labor	0.0209	0.0147
Supplies	0.0255	0.0056
Sub Total	0.0579	0.0460
Fuel	0.0473	0.0390
Power	0.0223	0.0245
TOTAL	$0.1275	$0.1095

A Petrographic Investigation of the Causes of Degradation of Sized Coal, Richard C. Neavel, Indiana Geological Survey.

A customer of a major Indiana coal producer noticed that some shipments of sized coal contained a large portion of undersize pieces. Also, in these shipments, the pieces which remained within specified limits were cracked and, when handled, crumbled readily. The producer, certain that the shipments had been properly sized at the tipple, suspected that degradation had occurred in transit. The Indiana Geological Survey was requested to examine the coal from one of these shipments to determine the cause of breakage.

Results of petrographic analysis brought the following conclusions:

The degradation that takes place after mining and preparation of coal (principally +2-in sizes) from this mine, and presumably from others as well, is caused by dessication affecting thin clay laminae in the coal. Shipments containing concentrations of coal with many clay laminae can be expected to degrade when subjected to the causative process.

Possibly because of the tendency of the high-clay coal to break into elongate slabs, these extremely clayey portions are concentrated on the larger sizes. As only one-fourth of the total mined coal contains concentrations of clay laminae, it should be possible to exercise care in blending the coal and thus prevent concentrating high-clay coal in any one shipment. The problem of severe degradation thus can be essentially eliminated. Treatment with an anti-dessicant (possibly oil coating) may also prevent degradation.

The Free-Swelling Index of U. S. A. Coals and Causes for the Wide Range in Values, Harold J. Rose, Bituminous Coal Research, Inc.

The free-swelling index is being used extensively to classify the caking and coking characteristics of U. S. bituminous coals. A USBM analysis shows wide variations in the free-swelling properties of 4,500 coals purchased by the U. S. Government from 18 states over the 10 yr period, 1948-57. Causes for the wide range of variations in the index (from 1 to 9) include the following:

1. The type and proportion of various petrographic components.

2. The rank of the coal, i.e., medium-volatile, low-volatile, etc.

3. Weathering of the coal in the bed.

4. Surface oxidation of coal after it is mined.

5. Variations in reports from laboratories due to variations in test conditions.

A comprehensive report is underway which will attempt to define in more detail the many variables involved in the free-swelling index.

Utilization

Fundamental Studies in Bulk Solid Flow, J. Richard Lucas, and W. J. Verner, Ohio State University.

A study at Ohio State University has sought to add to existing knowledge of bulk solids flow. The primary objective was to analyze the vertical stress function in bins by a new indirect measurement method known as the "Suspended Concentric Ring" technique. By this method, concentric rings on a circular bin base are used to measure the load or stress on known ring areas as the head of the material is incrementally increased.

The following general conclusions can be drawn from the study:

1. In a full non-flowing bin containing a bulk solid, the internal vertical stresses at any point are a function of the radius to that point, the head of the material above that point, and the density of the material, in addition to other variables.

2. The vertical stress function on any horizontal cross-sectional area of such a bin varies from a maximum value at the center to a slightly lower value at the bin wall, with considerably lower values between these two points.

3. The vertical stress function varies from a maximum at the base of a full bin to a minimum at the top, regardless of the distance from the bin center.

4. The magnitude of the vertical stresses greatly exceeds the magnitude of the horizontal stresses throughout the bin.

5. The areas of lower vertical stress concentration offer the preferred sites for withdrawal of bulk solids from the bin.

6. Empirical constants (K_U^1) unique to "bulk-solid bin material" combinations and appearing in Jassen's equation can be calculated from relatively simple laboratory measurements.

It is hoped that as the present research continues, additional conclusions of basic significance to bulk solid materials will be forthcoming.

Low Coke Button Bituminous Coal on Anthracite Equipment, J. Ludden and W. N. Sims, American Cyanamid Co.

Some 2 yr ago, we began investigating the use of low coke-button bituminous coal as a replacement for anthracite at our Bound Brook, New Jersey plant. Experience showed that steam-size anthracite was subject to periodic shortages of supply and to a constantly rising price trend. Management took to the idea because the shift in fuels offered the prospects of reducing steam costs without any change in existing equipment and without need of added capital investment.

Four boilers at Bound Brook now burn this type of coal. Three have a capacity of 100,000 lb per hr each, and one has a capacity of 200,000 lb per hr. The oldest was built in 1929—the newest in 1941. The basic design features for all four boilers are substantially the same.

Price advantages of low coke-button bituminous over No. 4 anthracite have

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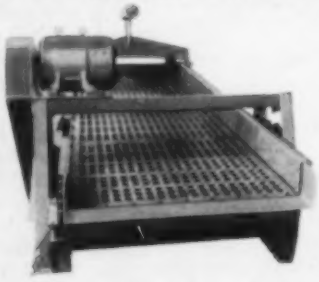

Tough and rugged Hendrick H Quality Steel Perforated Plate lasts longer, even under continuous and heavy-duty use, because it is made from heat-treated high-carbon steel. It screens coal easier and faster, while the full clearance of its perforation reduces downtime costs due to blinding. Product uniformity is assured throughout the life of the screen. For all these reasons, Hendrick H Quality Steel Plate can make the difference between profit and loss in coal preparation. Order Hendrick H Quality Steel with either flat, corrugated, or stepped surfaces, in any desired shape and with any size of perforation. Whatever you order, you get Perforated Plate which reflects Hendrick's 82 years of experience in selecting the steel the mining industry needs.

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proven out. Even with freight considered, the soft coal cost per million Btu was 32c compared to 39c for anthracite. Among other benefits, soft coal responds well to a sharply rising steam load which is often difficult with No. 4 anthracite; no unusual maintenance problems have been encountered in the operation of stokers during the past year; and not a single tube failure due to fly-ash cutting could be attributed to burning soft coal.

First Cyclone Furnace Boiler in Southeast, W. Bross, Greenwood Mills, Greenwood, S. C.

Essentially, the Cyclone Furnace is a water-cooled horizontal cylinder which burns coal at combustion rates exceeding 400,000 Btu per cu ft hr with gas temperatures of 3,000 F and above. Before coal is fed into the vortex of our cyclones, it is first passed through a hammer mill-type crusher and sized down to where 95% is minus ¼-in. The crushing process usually results in some 7 to 12% of the coal being fine enough to pass through a 200-mesh screen. This degree of fineness lends quick ignition properties to the cyclone.

Our experience with the cyclone furnace boiler shows:

1. It has not only been most satisfactory for efficient and dependable steam generation, but also reduces the number of major boiler auxiliaries needed in coal preparation, ash handling and combustion air systems.

2. By eliminating equipment, electrical switch gear, controls and foundations, it requires less space and reduces construction and installation costs.

3. Due to higher efficiencies obtained, it provides greater economy in operation.

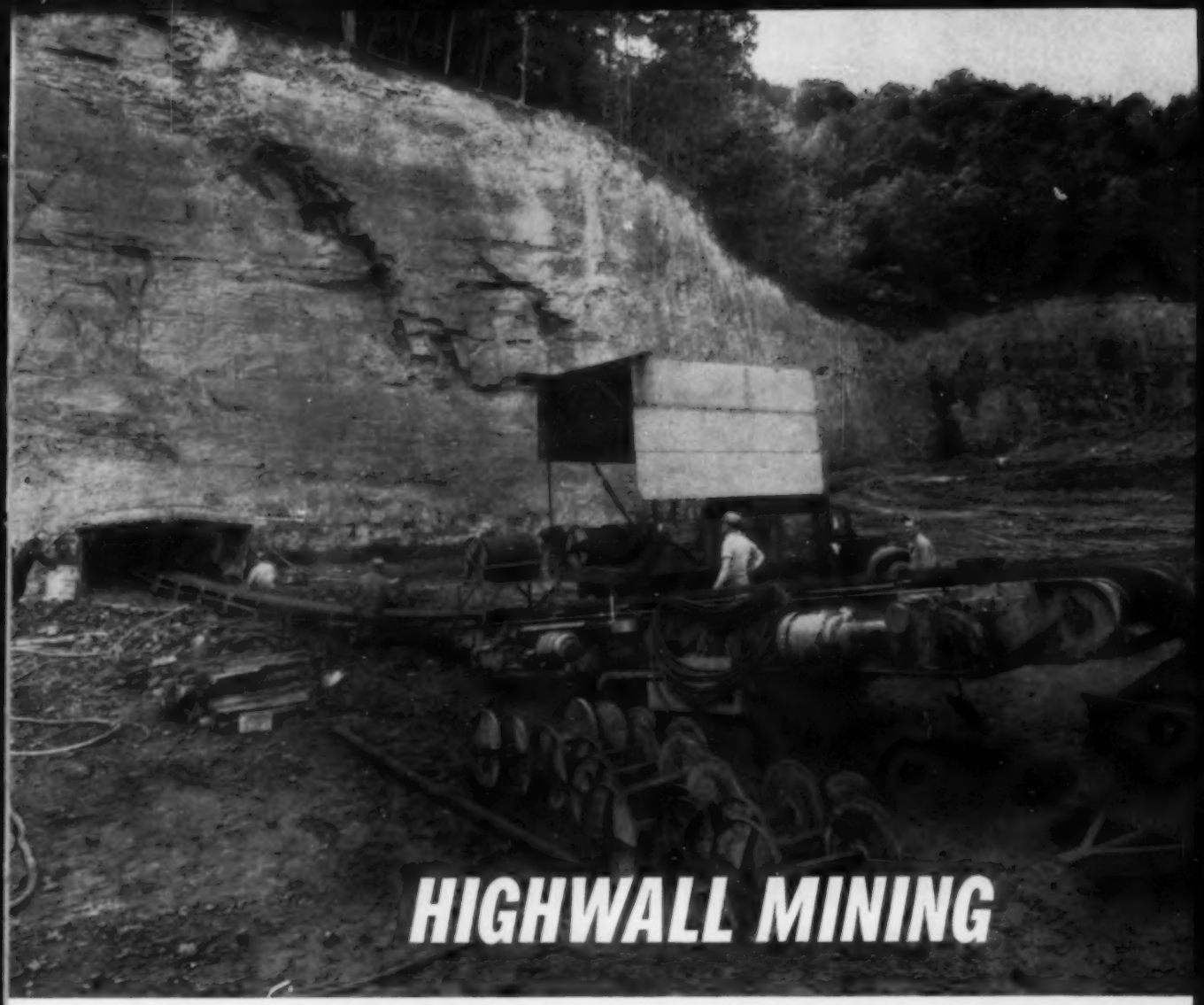
4. It reduces air pollution to a minimum without expensive collecting systems.

5. It produces ash which is relatively clean, easy to handle and dispose of, and which can be put to some useful, and in some instances, profitable service.

6. It can burn so-called lower grade fuels—an advantage where freight rates are favorable to using high-ash-content fuels.

7. It combines safety and dependability with simplicity of operation—lowering personnel requirements and greatly improving employee attitude.

8. It reduces necessary maintenance to a minimum. That which is required is relatively simple and does not require special maintenance skills or personnel.



with JOY EXTENSIBLE BELT
Drives 1000 feet in two shifts

Flexibility for rapid advance is a must in successful highwall mining. The operation shown here taking coal from the 40″ Lower Kittanning seam is typical of many successful applications of Joy Extensibles to this type of work. The tail section advances behind a continuous-boring type miner. Limberoller idlers are stored at crosscuts which are angled to the left every 100 feet. The tail and drive sections are linked with two-way radio-phone. Using a truck and a roller frame mounted astride the drive section, 100 feet of belting is added in an average time of less than two minutes. Maintenance is low . . . in two years of operation, only two Limberollers have been replaced and the conveyor has been out of service just once. The original belting is still in use. If you are planning secondary recovery, consult a Joy engineer and see a Joy Ex-Belt in operation. **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario.*

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WRITE FOR BULLETIN 258-1

JOY . . . EQUIPMENT FOR MINING . . . FOR ALL INDUSTRY

Is mine atmosphere eating the service life out of your equipment?

ALTHOUGH the corrosive atmosphere of a coal mine is "murder" on mine equipment, National Tube has come up with the solution for trouble-free mine drainage pipe. It's USS NATIONAL Polyethylene Pipe. Deadly corrosive mine water has no effect on it. Acids, alkalis, salts, and most chemicals are helpless against NATIONAL Polyethylene Pipe.

Although light, flexible, and easy to install, Polyethylene Pipe is tough. It takes rough handling without cracking, even at sub-zero temperatures, down to -90°F., and up to +120°F.

Once you start using NATIONAL Polyethylene Pipe, you'll not only stop laying out money for replacement drainage pipe, but you'll actually save money, since Polyethylene Pipe is the *most economical pipe* that can be effectively used for mine drainage.

Available in sizes from ½-inch to 6 inches in diameter, and in a variety of wall thicknesses, NATIONAL Polyethylene Pipe is manufactured from virgin "on grade" polyethylene raw material. For complete information, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

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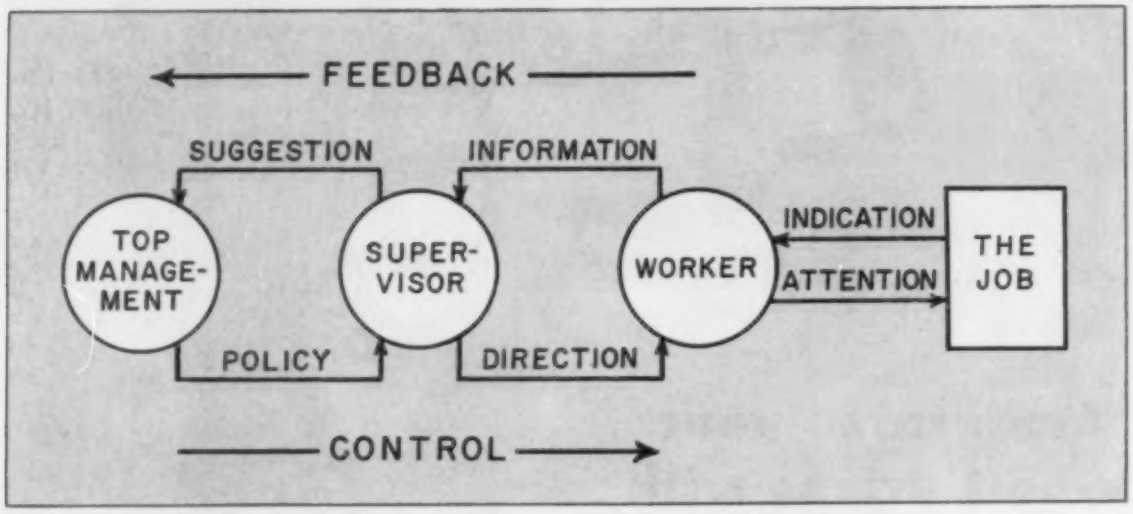
Foremen's Forum



EFFECTIVE COMMUNICATIONS lead to a system of management which parallels modern production methods.

Systems Engineering In the Management Process

Top-notch management and supervision are vital in getting maximum performance from new industrial systems.

SYSTEMS ENGINEERING is a term used to describe a relatively recent change in industrial practices. It is a broadening of the historical type of engineering in which experts in particular phases of operations exerted their influence on specific problems to keep production lines humming. Today's engineers now must be as deeply concerned in the design of industrial systems as in the design of the components of those systems.

By way of further explanation, we offer from the new McGraw-Hill book, *Management in a Rapidly Changing Economy*, edited by Dan H. Fenn Jr., this excerpt:

"A quarter-century ago, engineering tended to be a textbook, handbook, tradeschool affair. One learned how to do certain things, but relatively little attention was paid to fundamental physics and the principles underlying engineering practice. But, beginning about 1940, two things happened. First, there was an increasing emphasis on the underlying principles (the relationships between physical phenomena and engineering, and the relationships between information flow and control), and second, an awakening awareness of what has come to be called systems engineering (the interrelationship of the various parts of a physical system with each other, with the people who operate them, and with the economy in which they must be built)."

Numerous examples of this kind of systems engineering exist in our own industry. Nowadays, a well-designed mining system is a "package deal." All production activities, transportation facilities and service auxiliaries are carefully planned from the inception of the idea. The entire project is thought of as a unit.

An identifying feature of this modern engineering is the provision that is made for the correction of errors or malfunctions within the system. An example is the interlocking of a series of conveyor belts to permit sequence starting or to prevent pileups if one belt should go out of service.

Positive controls govern the normal operation of the system; while sensing devices detect the errors or malfunctions and feed this information back to monitoring controls which correct the error or interrupt the operation of the system. The feedback is important.

A similar major breakthrough in the science of management has been made or is now in process within progressive companies. The day of "seat-of-the-pants" management of large enterprises is about to close. Full success with automation requires integrated, professional management.

The diagram at the head of this piece represents our crude first attempt to picture this concept. Note that control proceeds from top management toward the job. Feedback passes from the job through intermediate stages back to management. The circuit is fabricated of effective communications, the hallmark of

Okocord Red Saddle twin Type W cable in action on loader and shuttle car at Intermountain Chemical Company's trona mine. Secret of Red Saddle's added strength and security against short circuits is the pre-formed, red neoprene protective wall between the conductors, and the compact construction in which all components are locked together for maximum ruggedness.

They've cut mining costs with tougher cables

"We've found that the longer life of Okocord cables means lower operating costs for us," says Jack Wilson, Maintenance Supervisor for Intermountain Chemical Company of Westvaco, Wyoming. "Our mining operation is almost 100% electrified. We need cables that can stand up to extreme abuse. Okocord mining cables have everything it takes to prevent work stoppages that waste man hours or immobilize expensive equipment." They're tough, highly flexible, and unaffected by oils, acids, alkalies or mine water.

On its shuttle cars—key to continuous, efficient operation—Intermountain finds that Okocord Red Saddle twin cable stands up best to high-speed reeling and unreeling . . . to being stretched tight against sharp tunnel wall corners . . . to frequent cable runovers . . . and to pulling and stretching. Says Mr. Wilson: "Okocord Red Saddle shuttle car cable minimizes internal shorts due to cable abuse."

There are Okocord quality cables to keep *your* mining equipment operating efficiently: shovels, drills, cutting equipment and other machinery. There are Okonite specialists ready and willing to help you in planning new cable systems. And there is an illustrated, 76-page booklet on mining cables that's free when you write for Bulletin CA-450, The Okonite Company, Passaic, New Jersey.

where there's electrical power . . . there's **OKONITE CABLE**

6218

good management in any industry.

Starting at the left in the diagram we see that management has the function of creating a settled policy. This policy is the by-law governing the conduct of operations. The supervisor has the function of converting this policy into job instructions without violence to the policy. The good workman attentively applies these job instructions to the job at hand. There is a training function to be fulfilled at each step if optimum results are to be achieved. Management must take great pains to convey and interpret company policy to supervisors, and supervisors have a responsiblity to zealously train their men, as discussed on numerous occasions in this department.

Now the feedback comes into play. The interested, well-trained workman will be the first one to sense that conditions of the job are changing, or that trouble impends. He receives these indications from the work he is doing. Within the limits of his own authority and ability he may compensate for these chang'ng conditions, but if the problem is too big he must inform his supervisor of the new conditions and lean on the foreman for help or revised directions.

If the problem is beyond the supervisor's experience or authority he may suggest to management that changes in procedures may be necessary, and out of this action may come a new policy. This is feedback working at its best.

One is tempted to say at this point, "automated production requires automated management." However, the need of the hour is for a philosophy of management that is not so impersonal as all that. Remember, true systems engineering includes due consideration for the people who will operate the systems and those who are to benefit from the operation of the system. Here are the steps we think should be followed:

1. Get the facts—The spreading interest in industrial engineering and its growing influence in coal production is evidence of the fact that coal is taking forward steps toward finding out what constitutes a good day's performance for an automated mining system. Many progressive companies, as a result of diligent time and method studies, are proceeding on facts.

2. Educate—Having the facts at hand, the next step is to use them in training operators and supervisors to increase actual operating time, eliminate breakdowns as much as possible or speed repairs when repairs become necessary. Progressive companies are taking advantage of in-company programs or training services provided by outside agencies to achieve these ends.

3. Communicate—A third requirement for full realization of the benefits of systems engineering is lively communications. Two-way radio, telephones, lights, buzzers, horns, memoranda, and other devices can be used to great advantage. Between-shift interchanges of information among supervisors and operators are vitally important.

These are the elements of good systems engineering. One of the beneficial byproducts for top management will be increased time for advance planning because routine, recurrent decisions can be solidified into policy as time passes.

Rx for Success

MUCH HAS BEEN SAID about the opportunities and challenges open to young graduate engineers in the coal industry. Not so much has been said about what the industry can reasonably expect from the young engineer. Assuming that his formal education has grounded him solidly in the fundamentals of engineering, the most important consideration for the young graduate is to ponder his own attitudes as he approaches his own career.

In a recent talk at Virginia Polytechnic Inst'tute, N. T. Camicia, vice president, Island Creek Coal Co., examined some of the pitfall attitudes young engineers should avoid. We think Mr. Camicia's remarks merit wide distribution because they can prevent disillusionment of young graduates. Reasonable personal attitudes among the young men can enhance their relationship with their chosen company and industry.

Mr. Camicia, who advanced through the ranks with Island Creek to his present position, thinks the attitudes that might deter a young engineer's progress are these:

1. Impatience—One of the greatest reasons for engineering failures is eagerness to be promoted, or impatience with the current assignment. Don't look at the next job up the ladder. Do well on the one you have first.

2. Lack of humility—You will meet many talented people who are not graduate engineers. They have a lot to offer you. They know a lot you will never learn in school. Do not wear your degree on your sleeve and do not act superior to these people. Be humble and sincere and these people will help you.

3. Fear of moving—In multi-mine companies you will be asked to move from time to time. Don't let friendship ties and community activities hold you to one location. Go where your company sends you. You will see more, learn more and thus grow faster if you do. You will be a broader person for having experienced a variety of mining conditions and methods.

4. Failure to learn how to handle people—Engineering training tends to make us logical, reducing everything to a formula, and we expect people to act logically. We tend to try to put human emotions and reactions into a formula or onto a slide rule. Because people do not behave according to scientific rules or logic, many engineers fail when moved to top jobs because they try to force human behavior to fit a scientific formula. If you desire to progress, begin now to learn more about people. Management is a lot different than running a traverse or making a mine projection. Begin now to learn to manage.

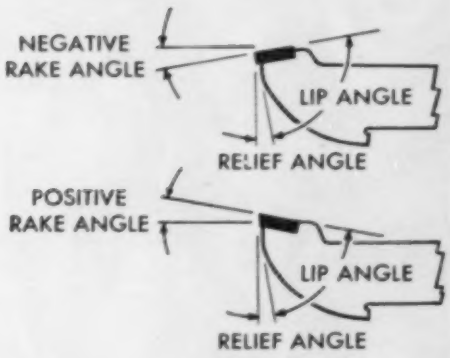
5. Applying a timetable to your future—Young graduates tend to set time limits for themselves. For example, they expect to be a chief in 3 yr or a superintendent in 5 yr. When they do not reach these goals in the expected time they become disgruntled and usually transfer prematurely. The future cannot be predicted this clearly. Do the job you have as though you were going to be on that job the rest of your life. Promotions will take care of themselves if you forget the job you want next year or 5 yr from now and concentrate on the job you now have.

6. Unrealistic expectations — Many young engineers fail because they expect to go from the campus to a wall-to-wall carpeted office with mahogany furniture and leather-upholstered chairs, from which they operate a company through a bank of telephones, push-buttons, buzzers and stenographers. Coal mining just isn't done that way. Your first several years of work will be done in a hard hat, boots, and dirty clothes —and you won't have an office. Keep your expectations realistic and down to earth, and you will climb faster.

Adapted from *Safety Newsletter*, published by Coal Mining Section, National Safety Council.

The CC-8 negative rake bit combines optimum rake and relief angles for more efficient cutting.

Full radius tip reduces side wear and drag.



Comparison of positive and negative rake bits shows the larger lip angle of the negative rake bit which gives greater cutting edge support.

NEW CARBOLOY® NEGATIVE RAKE BIT SUBSTANTIALLY REDUCES TIP BREAKAGE

Tool life increased by greater cutting edge support . . . proved by extensive underground tests of CC-8 bit

General Electric mining engineers and leading coal producers, after more than two years of development and testing, have *proved* that negative rake bits reduce coal cutting costs. *The new Carboloy CC-8 negative rake bit was designed from this research.* Here's how CC-8 cuts coal mining costs:

- **The cutting edge is greatly strengthened** by the increased lip angle (see diagram). In addition, the negative rake angle puts the tip in compression when cutting, utilizing the high *compressive* strength of the carbide tip. Result: less tip breakage . . . fewer bit changes.
- **Coal fines are significantly reduced** because the negative cutting angle breaks out larger pieces of coal ahead of the bit.
- **10° relief angle minimizes rubbing** and increases rate of penetration. The full-radius tip reduces side wear and tool drag . . . cuts more coal before regrinding.

You can get delivery *now* on this new CC-8 bit from your local Authorized Carboloy Mining Tool Distributor.

Send for free reprint of *Coal Age* article explaining in detail how negative rake bits can save money in your mine. For a copy of "New Bit Designs Contribute to Lower-Cost Coal Cutting," write to: *Metallurgical Products Department of General Electric Company, 11120 E. 8 Mile Road, Detroit 32, Michigan.*

CARBOLOY®
CEMENTED CARBIDES
GENERAL ELECTRIC

Operating Ideas

Blasting Agent Packed Faster

THE FIRST commercial bagger for packing explosives is in service at United Electric Coal Co.'s Fidelity mine, Du Quoin, Ill. The coal company uses a Bemis Packer-Ette bag-packing machine to pack its own mixture, which it calls Unimite. The explosive is patented, but consists basically of ammonium nitrate, coal dust and nitromethane. It is packed in polyethylene bags, Bemis waterproof laminated-textile explosive bags and in tin cans. A special metal ring or collar, designed by Mr. Quentin Bollmier, mixing plant superintendent, makes it possible for United Electric to pack the tin cans as well as both types of bags on the Packer-Ette.

Unimite is packed at Du Quoin not only for the Fidelity mine but also for the company's mines in Dawson Springs, Ky., and Canton and Cuba, Ill. The explosive is then shipped via contract truck to the consuming points. By centralizing the mixing and packing operations, United Electric has been able to develop a modern, efficient packing plant.

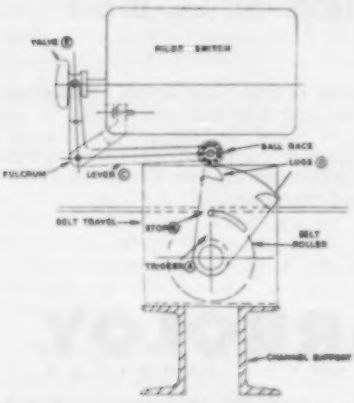
The heart of the operation is a two-level packing shed. The upper level contains two large stainless steel mixers where the basic ingredients of the explosive are mixed. Each mixer feeds into a packer on the first level of the shed, so two packers are required.

At present one of the packers is the Packer-Ette. The other is a foot-operated filling spout built by United Electric. The side-by-side operation of the two packers has given the opportunity to compare and evaluate performance. The commercial packer has proved so successful that United Electric is planning to install a second in the near future.

The Packer-Ette will fill a bag or can in only 8 sec. This rapid filling rate has resulted in substantially increased production of the blasting agent at United. Furthermore, the packer accurately weighs the material packed. Filling is controlled by a two-stage pulsating feeder tray. In the initial stage of filling, the tray feeds rapidly. In the last stage, however, it feeds at a slower rate that can be more closely controlled.

Capacities of the packing device range from 25 lb to 150 lb. A simple scale adjustment determines the weight packed. United, for example, packs 25- and 33-lb bags and 30-lb cans.

Automatic Cut-Off Protects Belt Conveyor From Damage



HERE'S a new wrinkle in belt-protective devices. Described in *Iron & Coal Trades Review*, the control was developed by W. C. Williams, a group mechanical engineer in No. 3 Area of the Southwestern Div. of the National Coal Board. Although designed primarily to prevent damage by stalled belts, the unit also prevents damage which might arise from automatic starting after a system has been shut down for some time. The accompanying sketch shows details of the components of the cutoff and their positions with belt in motion.

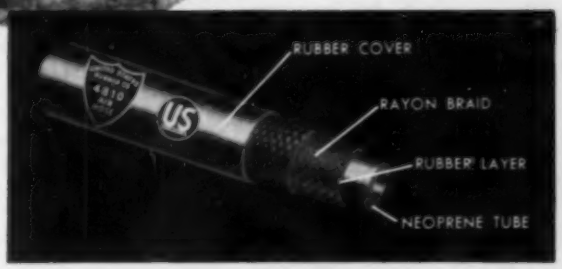
The lever C has a tendency to drop under its own weight, thus actuating the valve E. It is prevented from dropping by one of the lugs D however, when the belt is running.

The lugs are welded to a triangular plate which acts as a trigger for the system. The plate is attached to the spindle of a specially adapted roller that applies torque to the trigger when the belt is moving at normal speed, the torque in conjunction with stop B ensuring that lugs D are correctly positioned to support lever C.

When the belt stops, or slows below a pre-determined speed, the torque is reduced and the cam shape of the lugs lets lever C drop, actuating valve E to cut off the power supply.

An essential feature of the device is the adaption of a standard oil-filled roller to enable it to transmit torque to the trigger A. Six paddle vanes are welded to the inner circumference of the roller parallel to the axis and along the entire length inside the roller. Four additional paddle vanes are welded to the section of spindle inside the roller. There is a $\frac{1}{16}$-in clearance between the outer and inner vanes as the roller rotates. The roller is filled with heavy gear oil. When the roller rotates, the vanes attached to it cause the oil to exert force on the vanes on the spindle and in turn on the trigger A.

To restart the conveyor after the device has been brought into operation, the lever must be held up in the working position until the belt is up to speed and the trigger arm in position.



Where men and hose flex their muscles

Here's the hose that's as rugged as the men who use it. On the really tough construction jobs—where tight quarters, abrasive terrain and high working pressures take their toll of ordinary air hose—mandrel-made, wrapped-finish, U.S. 4810 Air Hose stands up to use *and abuse*.

Yet, despite its great strength, 4810 is no muscle-bound hose. "U.S." engineering has made it easier to handle, readily flexible, able to take higher working pressures—*and less expensive*—than the conventional air hose you might be using. It's one of a complete line of U.S. Rubber construction hose.

• • •

When you think of rubber, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

Mechanical Goods Division

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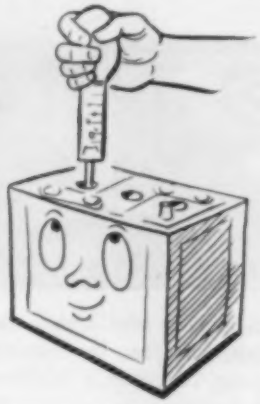
How to Get Maximum Cold-Weather Battery Performance

COLD-WEATHER STARTING of diesel-powered crawler tractors and other earthmoving equipment places heavy demands on storage batteries. Machine owners have come to expect convenience and dependability when starting diesel engines in all weather. Some machines come equipped with gasoline starting engines while others depend on cranking the diesel with electric starting motors. Even the gasoline starting engines often have their own direct electric starting systems. And most electric starting systems are dependent on one source of power—the storage battery.

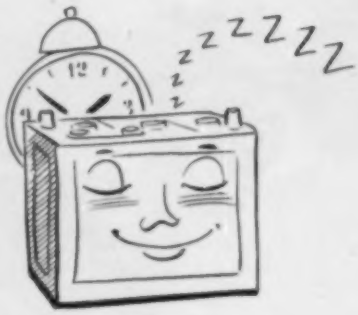
A storage battery has a limited capacity just as a water tank can maintain a flow of so many gallons per minute for only a certain number of minutes. The capacity of a battery is listed in ampere-hours, which tells how much current a battery will deliver continuously for a definite time. Capacity depends on how well the battery is constructed, its age, the size of the plates and how many plates are assembled in each cell.

Any battery requires some attention for continued satisfactory service. Here are some rules developed by R. H. Hawkins, manager, Central Div., Service Dept., Caterpillar Tractor Co. for battery care.



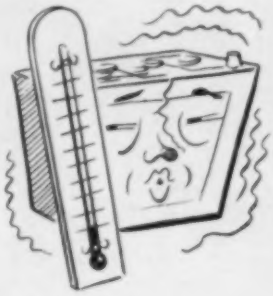
Keep Battery Charged

Maintain the battery in a normal state of charge—about 1.225 specific gravity—by keeping the generator output and voltage regulator in proper adjustment. Batteries have a much longer service life if they are kept at or very near full charge at all times. In normal operation, some discharging and charging of the battery takes place continuously, but the battery is not discharged to a great extent at any time.



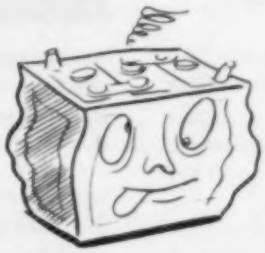
Allow Rest

Never use the starter more than 30 sec at a time and then wait about 2 min between cranking cycles. The brief rest period lets the plates cool and the battery recuperate sufficiently to again deliver a surge of power.



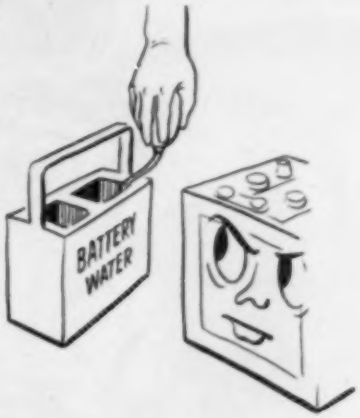
Prevent Freezing

In cold weather, never add water at the end of a day's run. Instead, add water in the morning immediately before starting or right after starting. In this way, the water will be thoroughly mixed with the acid by the end of the shift, and freezing of the electrolyte will be prevented.



Storage Procedures

Batteries not in use will lose their strength gradually when left on the shelf or stored in machines for an extended period of time. The higher the temperature, the greater the loss of energy. To keep them up to strength, recharge any batteries in storage when their specific gravity drops to 1.240. A fully charged battery will show a hydrometer reading of 1.270 to 1.280.



Periodic Check

A most important step in extending battery life is a periodic check of the electrolyte or water level. Most battery manufacturers recommend that water be added until it is ⅜ in above the plates. Be careful not to overfill the battery because this makes the electrolyte splash out and corrode all metal it contacts. Continued overfilling will result in so much loss of acid that the electrolyte may no longer be strong enough for the battery to deliver the required energy to crank the engine. If the battery requires water more often than once every two weeks, the charging rate is too high and it should be adjusted.

Cleanliness Counts

Wash the battery occasionally with baking soda. (1 lb of soda to 1 gal of water) to neutralize the acid which is on the case. Then rinse it with a stream of cold water. Wire brush the terminals until corrosion is removed and then coat them with petroleum jelly.

Four Ways to Save Money with CRD One-Use Bits

1. You drill faster with low-cost Le Roi-Cleveland CRD one-use bits because they have a special offset gauge feature which permits the use of thinner wings, and a steeper reaming angle. Binding is greatly reduced, and ample clearance is provided for cuttings.

2. You have less drill-steel breakage with Le Roi-Cleveland CRD one-use bits. The method of bit attachment eliminates threads on the drill rod. And since a drill rod is only as strong as the root diameter of its threads, the tapered, *threadless* CRD's give you a stronger, power-saving union, and longer drill-steel life. Other savings result from reduced handling and reconditioning costs.

3. You have less wear and tear, too. Rifle bars, rifle nuts, and chucks will last longer because CRD's are designed to reduce binding and ease strain on rotation parts of your drills.

4. They cost less, initially. CRD's cost less than 25¢, half as much as comparable multiple-use bits. There's a big saving in time and labor spent handling bits, too. CRD's knock-off, throwaway use eliminates unscrewing, and all the time-consuming traffic between operator and bit shop.

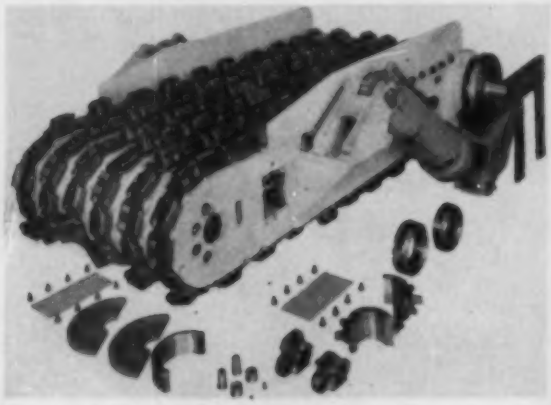
It costs practically nothing to try them. You don't need to invest in special threading or reconditioning equipment when you use Le Roi-Cleveland CRD one-use bits. Satisfy yourself that they can save you money. Get a can today, and start cutting your drilling costs right away.

WARCO

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Newmatic® air tools, portable and Tractair® air compressors, and stationary air compressors. Write us for information on any of these products.

AT-71

Equipment Developments



Multi-Bar Ripper Head

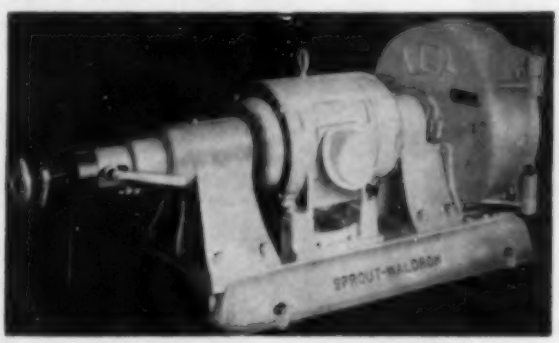
Adjustability is the major advantage claimed by Bowdil Co.'s new multi-bar ripper head. According to Bowdil, each cutter bar is independently and easily adjusted through side ports, making it possible to retain equal tension on all chains at all times. In addition, all chains are similar in kerf and lacing arrangement for interchanging. All sprockets also are interchangeable. Chains may be run with or without renewable liners in the cutterbars to suit the mining conditions. The ripper head assembly, says Bowdil, includes an improved design head-drive-shaft and sprocket assembly which makes it possible to renew a sprocket in minutes without removing the shaft. Other advantages listed by Bowdil are: improved hard-surface wearing shoes used in the cutterbar head to eliminate maintenance on roller and bearings; and sprockets clamped to an oversize shaft, thus locking shaft and sprockets into an integral unit that completely eliminates deflection, the chief cause of bearing failure. Bowdil office at Canton, Ohio.

World's Largest Scraper

A new earthmoving scraper from R. G. LeTourneau, Inc., Longview, Tex., claims to be the most powerful and largest in the world. The giant unit is labeled with a 70-ton work capacity, roughly equivalent to 50 to 60 cu yds. Making the new line of self-propelled scrapers possible is the "electric wheel" system, which includes a powerful DC electric motor geared directly to the inner-rim of every wheel. Also it includes AC motors spotted at other strategic points where power is needed—such as for steering, and for manipulating the loading and unloading mechanism. There are no wearing parts in the break system, and "power proportioning" shifts available power away from any wheel which might begin to slip. Electricity for all of this is generated by a 600-hp Cummins diesel, coupled to LeTourneau-built AC and DC generators under the hood. LeTourneau says the advantage to this system is that the 600-hp is efficiently transmitted by electric cables, thus avoiding the high costs of maintenance and down-time often required by conventional mechanical drives. The scraper is 62 ft long, 14 ft wide, and weighs 130,000 lb empty. It will travel at 20 mph fully loaded. Fuel capacity is about 325 gal.

Aluminum Coal Haulers

Huge aluminum coal haulers are being used in a southern Illinois strip mine. Built by General American Transportation Co., Chicago, with Alcoa aluminum, the giant trailers are 37 ft long, 11 ft wide, and 9 ft deep. Coal capacity of each trailer is almost 60 tons. A 335-hp Cummins engine, in a heavy duty tractor, supplies power for the trailer. A ten-speed transmission is required for off-highway hauling. According to Alcoa, the aluminum alloy in the trailer plate and structural members successfully withstands the impact of the more than five tons of coal being dropped into the trailer from the loading shovel. Alcoa says the new trailers have quite an advantage in decreased maintenance. Aluminum is resistant to corrosion, requires no paint, and is field-repaired easily. Also, sulfur compounds, found in coal, have a negligible effect in aluminum, whereas sulfur corrosion has been reported as a major factor in steel unit maintenance costs.



Fine-Coal Separation

A new development by Sprout, Waldron & Co., Muncy, Pa., claims economical separation of fine coal from waste slurries. The new development involves feeding the slurry to a Sprout-Waldron attrition mill and combining it with an oil such as kerosene. The severe agitation in the mill replaces the

Would haulage track like this help your mine?

Here is a modern, heavy-duty haulageway that was built for profitable operation tomorrow as well as today. Here is heavy rail that will stand up under peak traffic loads. Here is tangent track that is really straight; curved track scientifically eased to prevent derailments and spillage.

The turnouts and crossovers are husky, dependable designs that keep the trips rolling smoothly. The switch stands and other accessories are sturdy and foolproof. In fact everything about this system is right in step with the forward march of coal.

A Bethlehem engineer is ready to visit your mine to learn all he can about your problem. Next, he and other specialists will study it carefully and come up with a solution. Once you've approved his plans, he'll take the problem right off your shoulders. All new rail for curved track will arrive at the site formed to proper radii and ready to place in position. All turnouts and other components will have been carefully preassembled to assure perfect fitting. Installation will be quick and easy—with no wastage.

A carefully engineered layout pays for itself in a hurry. And you'll certainly incur no expense in talking things over with the Bethlehem engineer. He can be reached through the Bethlehem office nearest to you. Or write to the address below.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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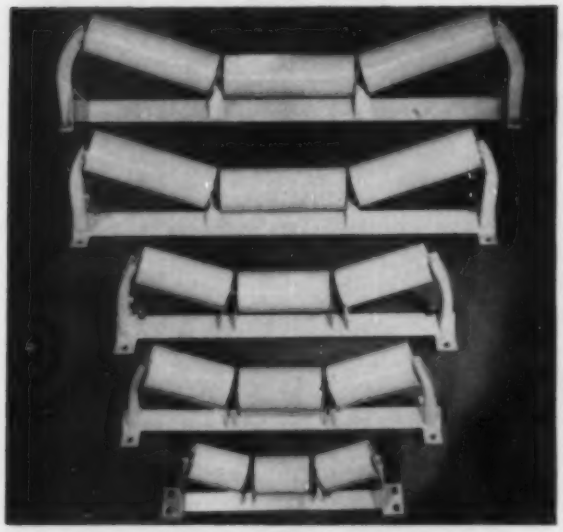
water on the coal particles with oil. The clay particles do not accept the oil and when the slurry is passed over a vibrating screen, the clay and water pass through—leaving the coal bound together by a thin, oily film. This reclaimed coal is then fed to a centrifugal filter which removes additional clay and reduces the moisture to a minimum.



Belt Conveyor Idlers

Link-Belt Co., Chicago, has introduced an expanded new line of belt conveyor idlers. Offered in five series and in widths ranging from 14 to 84 in, the new line includes more than 630 different types and sizes. According to Link-Belt the five series of idlers, designated as Series 5000 through 9000, make possible the exact matching of idlers to specific operating requirements of all belt conveyor applications. A wide range of idler types is available in most series. In addition to flat, 20-deg and 45-deg troughed idlers, others include: rubber cushioned idlers for use at loading points; positive action and actuating disc training idlers, and variable troughed idlers. Link-Belt says all of the new idler series feature inverted angle bases. On all idlers, removable steel retainer clips at each bracket hold rolls in position. All idlers are filled with grease at the factory and can be installed without further lubrication. "Grease-thru" lubrication is provided on all except the series 5000.

Loads, Transports, Dumps

Sanford-Day Iron Works, Inc., Knoxville, Tenn. has announced the development of a high-speed 4-wheel self-loading and self-dumping transport. According to Sanford-Day, the new unit, known as S-D Gismo Transloader, has successfully withstood thorough testing in both surface and underground work. The Gismo unit consists basically of a large dipper with teeth, intermediate to fold-back mechanism with adjoining self-contained haulage body and dump door. The dipper and fold-back action "cascades" material back into the Gismo until the large dipper loads itself. The entire machine becomes a transport with an approximate 6-ton payload. As a result the new unit can be used for mucking, loading, transporting and dumping. Additional features are power brakes, power steering, torque converter, maximum speed of 20 mph in either direction, no jackknifing in mucking operation, and since the machine travels equally well in either direction, no turning or positioning is necessary for loading.

New Tractor-Loader

A tractor-loader with two and a half times the lift capacity of any previous Ford loader unit has been announced by Ford Motor Co.'s Tractor & Implement Div., Birmingham, Mich. The tractor has a 7,000-lb-capacity front axle. A power steering system with the steering wheel requiring less than a complete turn to go from straight ahead to full right or left, provides quick maneuverability and isolates the driver from kickback. The tractor's engine develops 42.5 drawbar hp in the gasoline models. Option of a diesel engine is available. Ford's new loader, developed for use with this tractor has a 2,500-lb capacity, 5,500-lb break-away limit, and a lift height of close to 11 ft. Regular material bucket sizes are ⅝ and ¾ yd with sizes available up to one full yard. Hydraulic power for the loader comes from an independent "universal" hydraulic package, including oil reservoir, pump, oil cooler, filter, and control.

Rear-Dump Trailer

Easton Car & Construction Co., Easton, Pa., now has in production its new Model TS-1622 rear dump, variable wheel base trailer. Easton says the new trailer, known as the S-12 rear dump, is designed for use in combination with the Euclid (GMC) Model S-12 tractor. All tractor and trailer tires are interchangeable, and the trailer tires, wheels and brake parts are interchangable with those on the Euclid Model S-12 Scraper. Rated capacity of the trailer is 22 tons, based on material weighing 2,700 lb per cu yd. According to Easton, when the trailer is in travel position, the power-steered tractor can be cut to a 90-deg angle, permitting the unit to turn within a width approximately equal to its 28-ft 8 in length. Smooth, controlled dumping is achieved through the use of Easton's newly-designed single stage, double-acting hydraulic hoist, which is supplemented by an integral auxiliary control device developed especially for the new unit. A low maintenance factor is claimed by the hoist because it employs only one inner sleeve and one set of packing glands.

B.F.Goodrich

B.F.Goodrich tires give miner 25% more mileage than other makes!

WINTON Coal Mining Company works the strip mines in and around Tamaqua and Coaldale, Pa. Eighteen dump trucks haul tons of coal 15 miles over winding, mountainous roads. Low tire mileage and premature failures were problems for Winton until the company switched to B.F.Goodrich tires. Result: tire failures way down, mileage up as much as 25% over other makes—even two retreads.

Winton uses the Rock Logger tread which, like the new Rock Service, Universal and other B.F.Goodrich tires for mine work, is specially compounded to resist rock cuts and bruises. Rugged cleats bite in for full traction in forward or reverse. For extra-rugged jobs, you can get tires with B.F.Goodrich FLEX-RITE NYLON construction.

FLEX-RITE NYLON construction provides double the impact of ordinary materials, resists heat blowouts and flex breaks. This B.F.Goodrich cord body outwears even extra-thick treads, can be retreaded again and again!

See your B.F.Goodrich dealer today. He's listed under Tires in the Yellow Pages of your phone book—and he has money-saving tires for every mining job. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

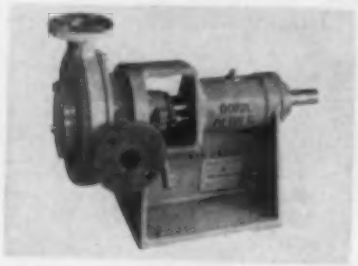
Smileage!

B.F.Goodrich *truck tires*

© The B.F.Goodrich Co.

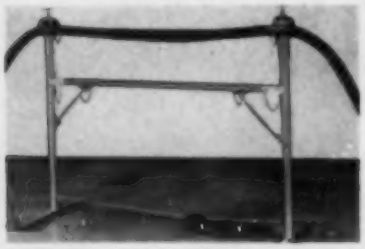
Portable Blast Hole Driller

Ingersoll-Rand Co., New York City, says that its Drillmaster is now available with a "beefed up" mounting that makes the unit even more rugged and portable than before. Set-up time for the unit, called the TRUCM-3 Drillmaster, is said to be only a few minutes because the drill tower is raised and lowered by hydraulic power. It can drill 350 ft of hole during an 8-hr shift. Air supply for the unit is supplied by a 600 cfm Gyro-Flo rotary compressor. The Drillmaster specifications are: height, 12 ft 6 in; length, 34 ft 11 in; width, 8 ft; wheel base, 175 in; weight, 33,000 lb; and a compressor fuel capacity of 180 gal.



Centrifugal Pumps

Dorr-Oliver, Inc., Stamford, Conn., announces the availability of three new centrifugal alloy pumps for filtrate and transfer applications. The new "LH" design operates at up to 3,500 rpm for increased capacity and head range. "LR" pumps, incorporating reverse inlet design, handle high solids slurries and volatile liquids. The type "LX" pump is designed for dismantling or complete removal from service without disturbance of connecting piping where corrosive service dictates high impeller and pump maintenance. D-O says that since all three of the new pumps incorporate the basic design of the Oliver type "L" pump, there is a high degree of parts interchangeability.



Cable Splicing Stand

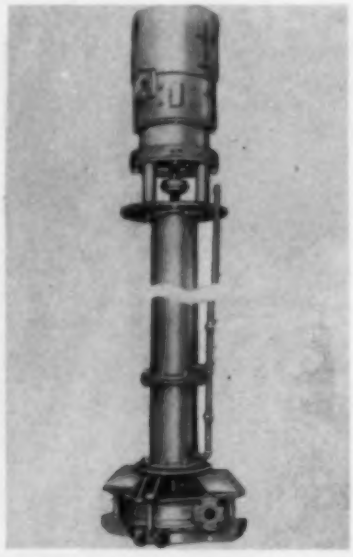
A new portable electric cable splicing stand that can be quickly assembled and disassembled has been developed by Austin Powder Co., Cleveland. Designated as Model H-1, it can be either set up or knocked down by one worker in less than two minutes. It weighs 16 lb and will handle all types of cables up to 3-in in diameter. Operation is simplified by two hinged pressure clamps that can be set to hinge in the same direction or opposite each other. A toggle device located at the bottom of the stand provides tension on the cable after splicing and assures application of a tight jacket. Removable braces are located at all points subjected to heavy stress.

Selective Gas Detection

The concentration of one gas in a multi-component mixture can be measured selectively and continuously with the M-S-A Thermatron, according to Mine Safety Appliances Co., makers of the unit. The instrument can be calibrated for any gas over either narrow (0-1) or wide (0-100) ranges of gas concentration. It claims accuracy within 2% of full scale throughout the selected range. M-S-A Thermatrons draw 100 watts. Sample requirement is 100 to 1000 cc per minute. No pump is required. Speed of response is 60 sec for 90 of full scale. Calibration is linear for most applications. Zero drift over a 30-day period is said to be negligible.

Scraper for Small Projects

The Construction Machinery Div. of Clark Equipment Co., Benton Harbor, Mich., has introduced a new four-wheel scraper, the "Michigan" Model 110. Designed for smaller projects, for self-loading jobs, and clean-up or finishing work, the Model 110's capacity is 8 cu yds struck, 10½ yds heaped. Teamed with a Model 180 tractor dozer or equivalent prime mover, the new scraper offers all hydraulic control. The scraper's cutting edge consists of four interchangeable and reversible sections to permit offset or straight blade arrangements. The scraper is 27 ft 7 in long; 8 ft 4 in wide; and 9 ft 6 in high. Empty weight is 14,450 lb; fully loaded, 40,450 lb. Rear wheel air brakes are optional.



Vertical Slurry Pump

A new vertical heavy-duty slurry pump (type RXV) for submerged operation in wet pit sump service has been introduced by Morris Machine Works, Baldwinsville, N.Y. Designed to handle the heaviest slurries of sand, coal, tailings, crystals, chemical sludges or abrasive plant drainage, the RXV pump is available in nine models varying from 2 to 8 in in size. According to Morris, outstanding features are: low speed and continuous duty with both heavy and fine slurries; quick dismantling since only four bolts clamp the liquid end of the pump; no stuffing box

For extra-rugged service

an extra-rugged bond

USS Tigerweld BF-12

Look at this photo and you will see why the Tigerweld BF-12 is so durable. The raised shoulders on each of the terminals form V-shaped troughs with the web of the rail. Into these troughs you can lay extra metal to guarantee a permanent weld.

The terminals and the strand are connected by the familiar Tigerweld butt-weld which makes the joint stronger than the strand itself. The heat of welding cannot harm the joint. The entire bond has the strength to stand up under heavy stresses, and the reinforced steel-to-steel weld of the BF-12 gives you added assurance of long bond life.

Easy to install. A couple of hammer blows on the terminals will hold it to the track while you weld. No clamps are needed. You save time . . . you save expense with installation crews.

NEW CATALOGUE. Our latest revised catalogue gives full details on all Tigerweld Power Bonds. Write today: American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio.

USS is a registered trademark

American Steel & Wire
Division of USS United States Steel

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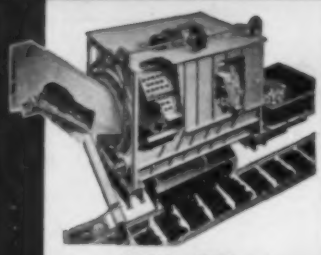
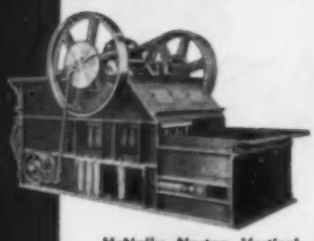
America's most complete line of CRUSHING EQUIPMENT



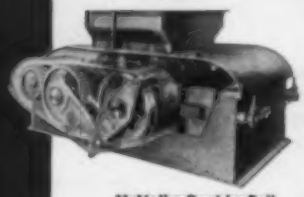
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.

McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*

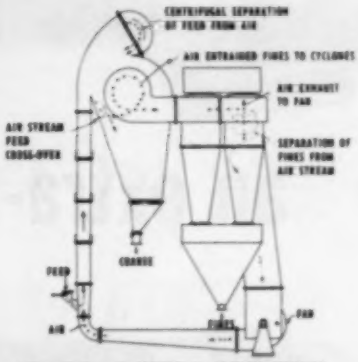
or vapor binding and the RXV has self contained thrust carried in the motor base.

For Faster Roof Drilling

A carbide-tipped roof bit that claims faster roof drilling has been developed by Austin Powder Co., Cleveland. Known as Model RDA, it is designed to withstand the shock and abrasion of high speed drilling in all types of rock. Also, because it requires less feed pressure, it is reputed to cut faster with less wear, particularly in hard formations. The bit is available in two sizes for drilling 1⅝-in and 1½-in holes. The bit is adaptable for either wet or dry work, according to Austin.

Ground Detection

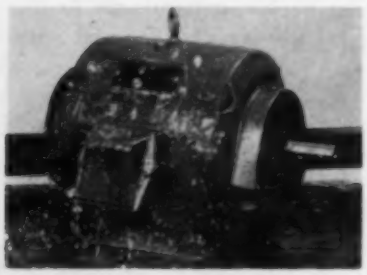
Parr Mfg. Co., Newark, N.J., has developed a ground detector and alarm system to warn of accidental grounds on power lines. Called the Brunt ground detector and alarm, the instrument is for use on AC and DC, 25 to 400 cycles, 1, 2, and 3 phase on voltages of 120, 240, and 480-600. The indicator lamps on the face of the unit glow with equal intensity until a ground occurs on the system. At this point, one of the three lamps will go out and the other two glow brighter, the dimmed lamp showing on which phase of the system the ground has occurred. Simultaneously the red warning lamps begin flashing, giving another visual warning, and a relay actuates a horn or bell to given an audible warning.



CENTRIFUGAL CLASSIFIER IN CLOSED CIRCUIT

Centrifugal Classification

The Buell Engineering Co., New York City, announces a new centrifugal classifier system which separates dry fines from coarse materials at a high efficiency level. According to Buell, the new classifier has no moving parts, requires virtually no maintenance, and utilizes only 0.04 to 0.5 hp per ton per hr. In operation the system uses centrifugal and gravity forces, and a scrubbing action to separate the fines from the larger particles. The classifier is available in sizes to handle from 100 lb to 100 tons of feed material per hour, and is particularly recommended for classification applications in the 400-200 mesh range.



Weatherproof AC Motor

A new weatherproof AC motor for use in "outdoor" type applications where the motor is subjected to extreme mois-

Get 'em there FASTER-

with KERSEY TRACTORS

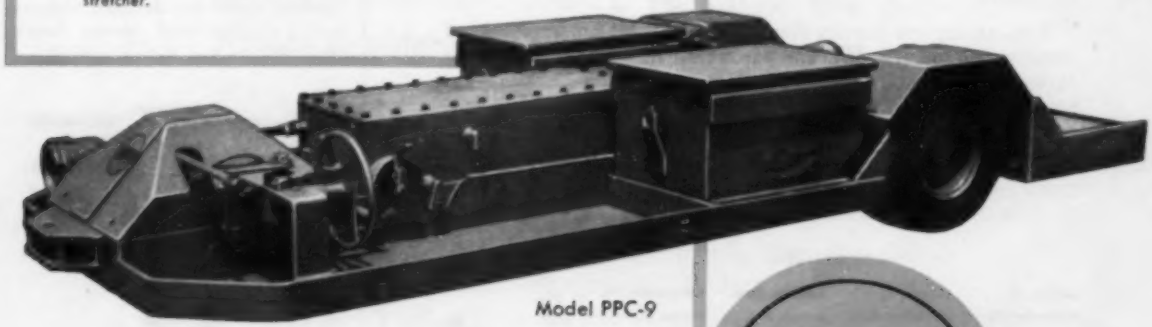
Permissible PPC-9 & 10 Personnel, Supply and Service Tractors Provide Maximum Safety . . . Maximum Time-Saving

- Speed up work of mechanics, electricians, repairmen as well as officials. (PPC-9 seats six; PPC-10 seats eight).
- Quickly remove injured. Rear cargo decks will accommodate stretcher.
- Easily transport tools and supplies. Detachable rear cargo compartments have capacity of 2,000 lbs.
- Also double as tractors for towing supplies and man trip cars.

KERSEY
Model PPC-9 & 10

(U. S. Bureau of Mines Approved Certificate No. 21285)

AXLE ASSEMBLY	Heavy-duty 4,000 lbs. Rated differential assembly with power-lock. Power-lock unit maintains traction on both rear tires even though one tire may be on a slippery surface.
BATTERY	12.8 K. W. H. Battery, in two steel trays with covers. Each battery tray equipped with Kersey Fused Receptacle Enclosure. (Approved by U. S. Bureau of Mines).
BELL	6" Trip Gong. Serves as warning device to meet mine safety laws.
BRAKES	Hydraulic — Airplane Disc Type.
CONTACTOR	Magnetic Type, in permissible enclosure. Two-speeds — forward and reverse.
DRAW BAR PULL	For starting: 7,300 lbs.
LIGHTS	Permissible — Front & Rear.
LIGHT SWITCH	Mounted within permissible enclosure. Operates front and rear lights. Both lights do not burn at same time.
MOTOR	6-½ H. P. Series Wound, Heavy-Duty Gearmotor in permissible enclosure.
MASTER OPERATING SWITCH	Mounted within permissible enclosure.
RESET SWITCH	This is a safety switch which must be closed before master switch will operate.
REDUCER	Kersey, Model 57. Designed to withstand 300% overloads. Ball bearings are used throughout reducer. No critical adjustments. Optional speed ratios.
WIDTH	PPC-9 width is 62". PPC-10 width is 74" giving more room for personnel and equipment.
SPEED	Standard Fast Speed: 350 R. P. M. Slow Speed: 230 R. P. M. Two speed each direction: 3 & 6 M. P. H.
TIRES	Rear — 6.50 x 10, 6 Ply Industrial Type — Rib Cleat Tread. Front — 5.50 x 8, 8 Ply Industrial Type — Rib Cleat Tread.



Model PPC-9

If you are starting a new mine or modernizing your present mine--check with us, first. We would like to work with you in laying out your plans to include the most efficient and flexible system for moving supplies and personnel.

KERSEY MANUFACTURING CO. INC. BLUEFIELD, VIRGINIA

CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING • GROUT HOLE DRILLING

Skilled crews and complete stock of core drills
and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

How to keep customers happy— all winter long

Treat all shipments with Sterling Rock Salt, and your customers will be able to unload coal *fast* even in freezing weather. They won't have to thaw your cars or loosen coal by hand. Customers will gladly pay the small premium for coal that is treated so it won't freeze up! You can apply Sterling Rock Salt quickly, too. Just three or four bags of this effective anti-freeze agent will keep an entire carload of coal from freezing! (It takes only 5 lbs. of Sterling Rock Salt to protect one ton of bituminous; 5-8 lbs. for anthracite.)

You can also use Sterling Rock Salt to prevent frozen scales and switches . . . to keep roads and yards clear throughout the winter. It removes snow and ice *fast*. In bulk carloads or 100-lb. bags, regular or Inhibium-treated to prevent corrosion of metal equipment.

Free folder gives further information on Sterling Rock Salt for mines, collieries. Ask your Sterling representative or write to INTERNATIONAL SALT COMPANY, INC., DEPARTMENT CA-1158, SCRANTON, PA.

SALES OFFICES:

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Baltimore, Md.	Cincinnati, Ohio	Newark, N. J.	Pittsburgh, Pa.
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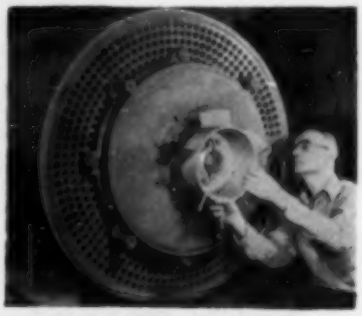
Buffalo, N. Y.	Detroit, Mich.	New York, N. Y.	St. Louis, Mo.

STERLING ROCK SALT
INTERNATIONAL SALT COMPANY, INC.

Equipment News *(Continued)*

ture or elements is now available from Reliance Electric & Engineering Co., Cleveland, in all standard speeds in sizes from 1 through 250 hp. All of the motor's external parts are of corrosion-proof cast iron. Shaft openings are sealed by a shaft cap and slinger. Reliance says the insulation system will not absorb water. It features silicone sleeving, glass-mica slot liners and glass mat top-sticks and mid-sticks. The rotor OD and stator ID are coated with rust inhibitor.



Squirrel-Cage Motors

Tube type totally enclosed fan-cooled squirrel-cage motors are offered in polyphase ratings through 500 hp by Wagner Electric Corp., St. Louis. Wagner says efficient cooling is provided in these fabricated steel frame motors by a series of tubes through which outside air is forced by an external blower. Standard enclosed motors are built with class A insulation for 55-deg C rise or with class B insulation for 75-deg C rise. Explosion-proof motors are built with class A insulation only and have Underwriters' Laboratories approval for operation under classified hazardous conditions. Standard models are designed with steel-backed babbitt-lined sleeve bearings lubricated by the oil-ring method.

Spray Nozzle Connectors

Spraying Systems Co., Bellwood, Ill., has developed split-eyelet connectors to simplify mounting of spray nozzles and equipment to piping and tubing. According to the company, the connectors

Right formula for your coal . . .

ASHLAND Permatreat

Permatreat coal spray is an oil carefully refined and formulated to solve the particular problems of treating your type of coal.

When your coal is sprayed with Permatreat, it becomes dust-proof, water-proof, freeze-proof and non-corrosive.

Your coal ships and handles easier . . . stockpiles longer . . . and resists windage losses.

Convenient supply points assure immediate delivery. Yours for the asking—our special technical, research and consultant services. Just write, wire or phone us.

One Permatreatment lasts the life of the coal!

For immediate service call any of these convenient Ashland offices.

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Ashland PERMATREAT

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

CRUSH RUN-OF-MINE TO FINE SIZES

IN THIS TWO STAGE UNIT

With a ratio of reduction greater than ever before available, this single two-stage unit does the work normally assigned to two crushers. A unique hydraulic system allows changing product size without stopping the crusher, and also protects against tramp iron.

Get All the Facts—
Ask for
Bulletin BDTR-57

The McLanahan Triple Roll Crusher is composed of two elements—a primary single roll crushing against curved crushing plate; and double roll secondary performing the final reduction.

McLANAHAN SINCE 1835

TRIPLE ROLL CRUSHER

Equipment News *(Continued)*

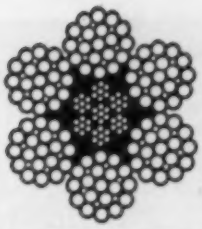
are designed for liquid, gas, and air line for pressures up to 250 psi, and provide leak-proof connection of ⅛-in and ¼-in spray nozzles of all types. The connectors are supplied in clamp sizes to fit ½-in, ¾-in, and 1-in pipe, and tubing sizes (OD) of 13/16, ⅞, 1 1/16, 1¼, and 1⅝-in.

DC Welder, AC Power

A combination DC arc welder of 200 amp capacity and AC power unit of 5-kw capacity is now available from Hobart Bros. Co., Troy, Ohio. Hobart says its "PowrWeld" unit provides DC welding current (for either straight or reverse polarity electrodes) instead of AC welding current with the AC power. Also, AC power can be drawn from the unit for lights and tools at the same time it is being used for welding. The DC welding generator is rated 200 amp at 25 V, on 100% duty cycle, and has a welding range of from 30 to 225 amp for intermittent use. The same generator provides full 5 kw, 100-120-V, single phase, 60 cycle AC power. An Onan air cooled, 4-cycle, 2 cylinder, Model CCK engine is directly coupled to the generator.

New Ammonium Nitrate

Spencer Chemical Co., Kansas City, Mo., has developed a new type of am-



For extra high strength

use

WICKWIRE

DOUBLE GRAY

...save money...increase safety

In many operations where wire ropes occasionally operate near their breaking strength, it will pay you to switch to Double Gray. If you use Double Gray on your present equipment, under equal load conditions, you'll get a safer, more economical operation. That's because Double Gray's higher strength* allows you to operate with a greater safety factor—resulting in longer rope life and less equipment downtime.

***** *Wickwire Double Gray Wire Rope is made of extra-improved plow steel. Fortified by an independent wire rope core of the same extra high strength steel, Double Gray rope has a 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.*

For your free copy of our informative new Double Gray booklet, write to:

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WICKWIRE ROPE — A CF&I PRODUCT

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PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

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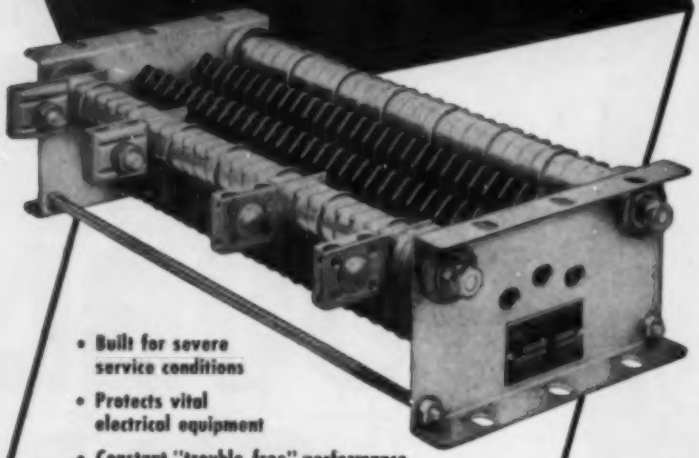
6401

LOOK FOR THE YELLOW TRIANGLE

P-G Steel Grid Resistor
plays an *essential part*
in the production of COAL . . .

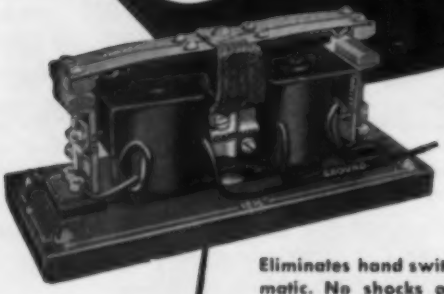


- Built for severe service conditions
- Protects vital electrical equipment
- Constant "trouble free" performance

These rugged nonbreakable units have proved their merit in all kinds of service for many years. Made of steel and mica, plus P-G unique and exclusive grid design, P-G Resistors are capable of protecting your most vital electrical equipment, even where service requirements are severe.

Designed to fit your present resistor space

P-G AUTOMATIC Transfer Switch



Single or double trolley and reel

Eliminates hand switches—entirely automatic. No shocks or burns to operator while changing from trolley to reel. Simple, safe, efficient, easy to install, can be mounted anywhere. For 250 to 600-volt service. Complete with cover.

P-G

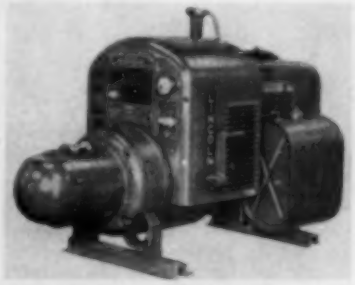
THE POST-GLOVER ELECTRIC COMPANY
OFFICE and FACTORY—Kenton Lands Road, Erlanger, Kentucky
MAILING ADDRESS—Box 709, Covington, Kentucky

Equipment News *(Continued)*

monium nitrate which it says can completely eliminate the need for dynamite in field-compounded explosives. The new ammonium nitrate is combined with fuel oil and detonated by using only a ⅜-in detonating cord in the blast hole. It differs from the standard fertilizer grade currently used in blasting in that it is basically an uncoated material with a special surface treatment said to eliminate caking and improve prill structure. It is packaged in a heavy-walled polyethylene bag which makes it waterproof. Less material is needed for the same job, says Spencer, since the "N-IV" is 100% ammonium nitrate by weight.

Pistol for De-Scaling

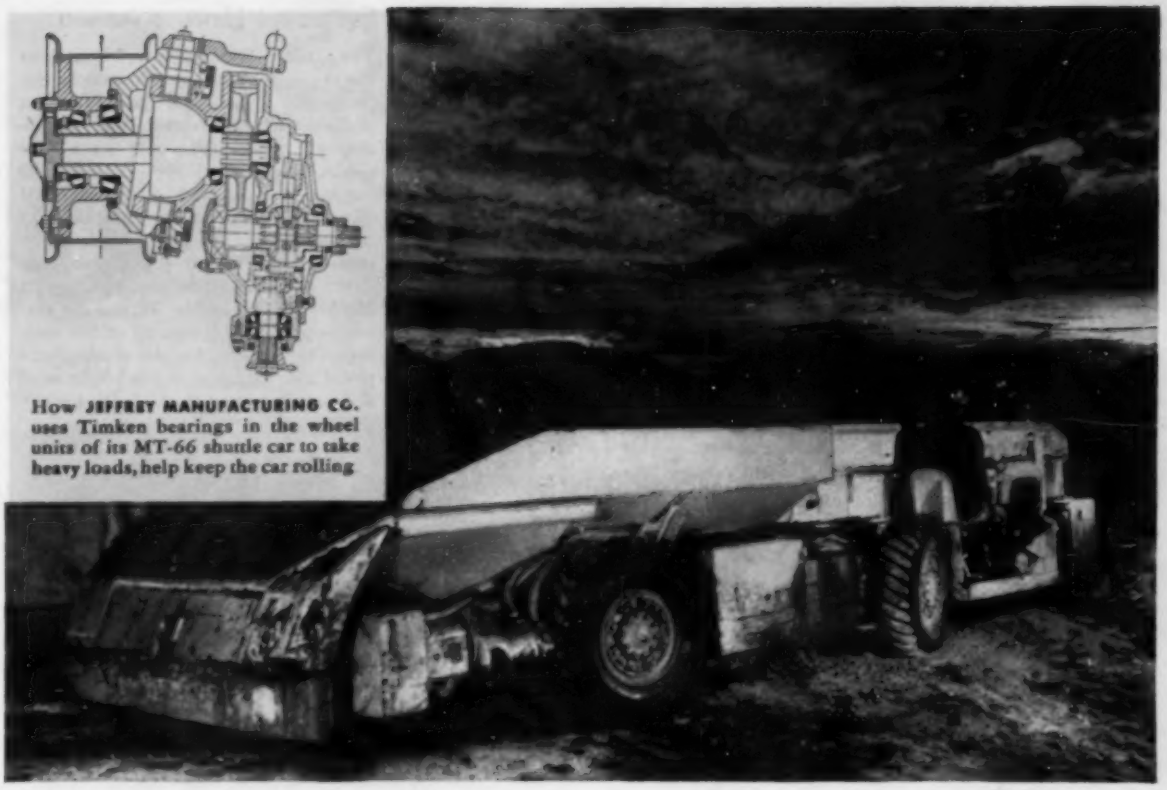
The Marindus Co., New York City, has developed a pistol for de-scaling, de-rusting, and cleaning. According to Marindus, here's how the pistol works. Compressed air from any normal industrial type compressor drives the pistol's hardened steel needles, which, with their impact on a spring-loaded recoil movement, rapidly remove scale and rust, even from the most inaccessible points, using specially designed adaptor heads such as chisels, if required. The action is controlled by a trigger on the handle. Air continually flows over the working surface, removing rust or paint, and leaving the surface visibly clean. Normal working pressure is 88 psi and air consumption is 12.5 cfm.



Combination Welder

A combination AC power supply and AC arc welder has been announced by Lincoln Electric Co., Cleveland, Ohio.

How JEFFREY MANUFACTURING CO. uses Timken bearings in the wheel units of its MT-66 shuttle car to take heavy loads, help keep the car rolling



Shuttle car takes the coal—Timken® bearings take the heavy loads—up, down and sideways

THE Jeffrey MT-66 shuttle car must take heavy shock loads when the loaded car hits a chuck hole at full speed on bumpy, uneven mine floors. To take the heavy loads from all directions, help assure dependable performance, Jeffrey Manufacturing Co. uses a total of 26 Timken® tapered roller bearings in the car's wheel drives and conveyor drives.

Rollers and races of Timken bearings are case-carburized to have hard, wear-resistant surfaces and tough, shock-resistant cores. The tapered design of Timken bearings lets them take *both* radial and thrust loads in all combinations. Full-line contact between rollers and races gives Timken bearings *extra* load-carrying capacity. Bearings last longer, hold gears and running parts in position.

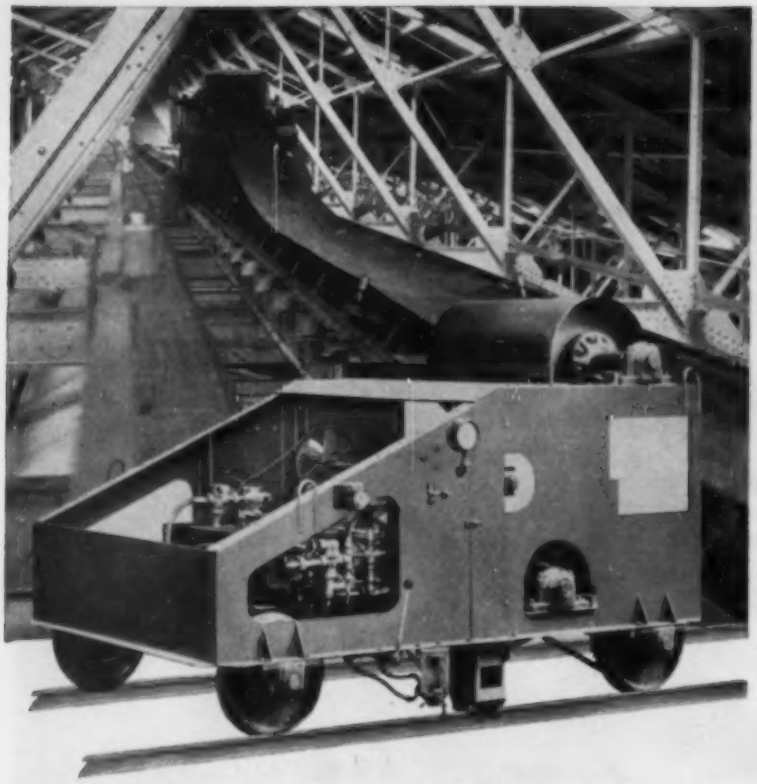
Because Timken bearings keep housings and shafts concentric, they make closures more effective. Dust, dirt and moisture stay out. Lubricant stays in. Maintenance is reduced.

And the car starts and rolls easier because Timken bearings practically eliminate friction. They're geometrically designed and precision made to roll true. To further insure quality, we even make our own electric furnace fine alloy steel. No other American bearing maker does. So to get your No. 1 bearing value, always specify bearings trademarked "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.



Continentals' NEW (patented)

Hydraulic Tripper

handles all materials safely — with NO ELECTRIC CONTROLS!

This entirely new Continental Hydraulic Tripper offers unique advantages —

- No electric trolley wires — no cable reels — no line maintenance
- Hydraulic controls throughout; fully enclosed hydraulic system
- Belt-powered through hydraulic motor to tripper wheels
- Hydraulically operated spring-set brakes position tripper without creep, crawl, or accidenal release
- No clutches or friction drives to corrode during down time

CAN BE SUPPLIED WITH FIRE-RESISTANT MATERIAL IN HYDRAULIC SYSTEM!

Call, wire or write your nearest Continental office for details.

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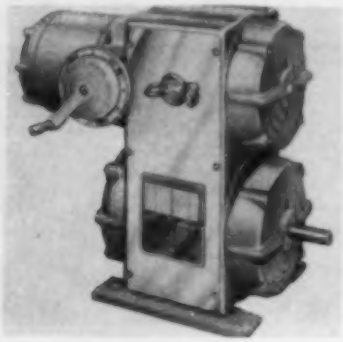
INDUSTRIAL DIVISION

Continental Gin Company

BIRMINGHAM ALABAMA

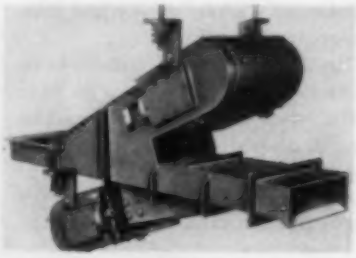
Equipment News *(Continued)*

The new "Weldanpower" machine serves as a 5-kva power supply for use when commercial power is not available in addition to being a 200-amp AC welder. The unit has a Wisconsin air-cooled, 4 cycle model TFD engine. It delivers 13.1 hp at 2,000 rpm. The "Weldanpower" provides 115 or 230 V, 60 cycle, AC single phase power. It is rated at 5 kva continuous duty. Maximum continuous current at 230 V is 18.2 amp. The AC welding current supply ranges from 20 to 200 amp. Separate windings for the welding and power circuits make it possible to weld and supply power at the same time.



Adjustable Speed Drive

The Louis Allis Co., Milwaukee, recently announced a new mechanical adjustable speed drive, called the Allispede drive, that claims infinitely adjustable speed over an AC power source and is available in ratings from 1 to 20 hp with output speeds of 1 to 10,000 rpm. Its "building block" principle permits vertical or horizontal mounting of units on floor, wall or ceiling; location of output shaft and motor in any of four positions; and location of speed changing mechanisms on top, right, or left of motor housing. Drives supplied with single or double reduction gears can have gear ratios changed in the field.



Vibratory Feeders

Syntron Co., Homer City, Pa., says its new special model heavy-duty electromagnetic vibratory feeders are specifically designed for high capacity feeding

for profitable auger mining

COMPTON COAL Augers... *increase coal recovery 12% to 65%*

1 COMPTON "SINGLE HEAD" AUGERS
for high seams

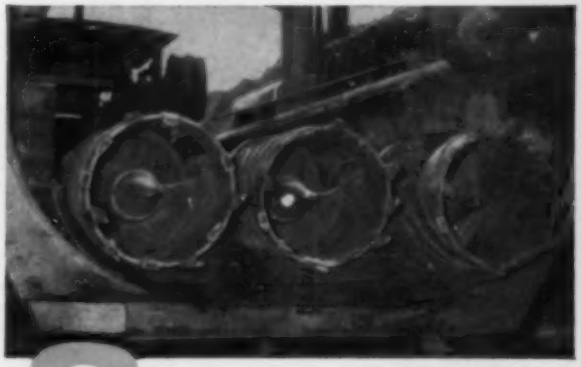
Compton "Single Head" Augers are available in four models with head sizes 28″ to 52″.

2 COMPTON "TWIN-HEAD" AUGERS
for thinner seams

Compton "Twin-Head" Augers provide profitable thin-seam production. Available with head sizes 24″ to 32″.

The Compton line of single and multiple-head coal augers pave the way for maximum coal recovery regardless of your seam sizes and conditions. Together with other highly desirable features, the Compton patented non-clogging lump recovery head cuts coal at a high speed . . . provides maximum recovery in record time.

Call Compton today! Learn how planned auger mining with Compton Augers will lead to handsome profits through maximum recovery!



3 COMPTON "TRIPLE-HEAD" AUGERS
for seams as thin as 24″

New Compton "Triple-Head" Auger delivers profitable tonnage from extra thin seams. Available with head sizes 16″ to 22″.

Compton, Inc.

BOX 1946 • PHONE: MAIN 4-6383 • CLARKSBURG, W. VA.

WHEN LOOKING FOR AUGERS—LOOK TO COMPTON

Tubular High Strength

VICTAULIC®

METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

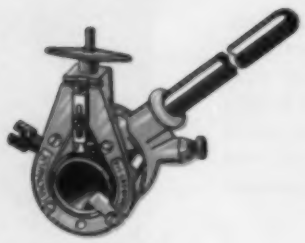
VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS
For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 12".

VICTAULIC SNAP-JOINTS
The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB

VICTAULIC FULL-FLOW FITTINGS
Elbows, Tees, Reducers, Laterals, a *complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".



VIC-GROOVER TOOLS
Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

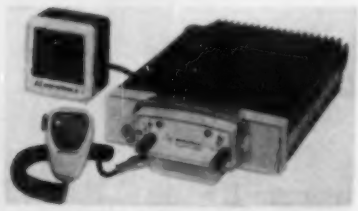
"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. A-11.

VICTAULIC COMPANY OF AMERICA
P. O. BOX 509 • Elizabeth, N. J.

Equipment News *(Continued)*

where installation space is limited. Model range offers maximum feeding capacities ranging from 25 to more than 1,000 tons per hour of dry materials weighing approximately 100 lb per cu ft. The feeders can be built with standard or special troughs of stainless or regular steels. They also can be equipped with dust-tight covers for magnets and troughs, and with dust seal attachments for trough inlets and discharges.



Two-Way Mobile Radio

A step toward a completely transistorized two-way mobile radio has been achieved, according to Motorola, Inc., Chicago, in announcing its new MOTRAC radio radiophone. Using more than 20 transistors, the new radio claims a completely transistorized receiver and power supply, and a partially transistorized transmitter. The unit is 3 in high, 11 in wide, and 17 in long. Motorola says a primary advantage of the unit is its low power consumption. It draws only 1.82 amps. It will be available for operation in both the low (25-54 mc) and the VHF (147-174 mc) bands.

For Flammable Liquids

Eagle Mfg. Co., Wellsburg, W. Va., is introducing a new industrial filler-dispenser safety can for use wherever flammable liquids are handled. The can, which comes in 2½- and 5-gal sizes, has a flexible metal spout that permits pouring or dispensing liquids into small openings without spilling. The pouring

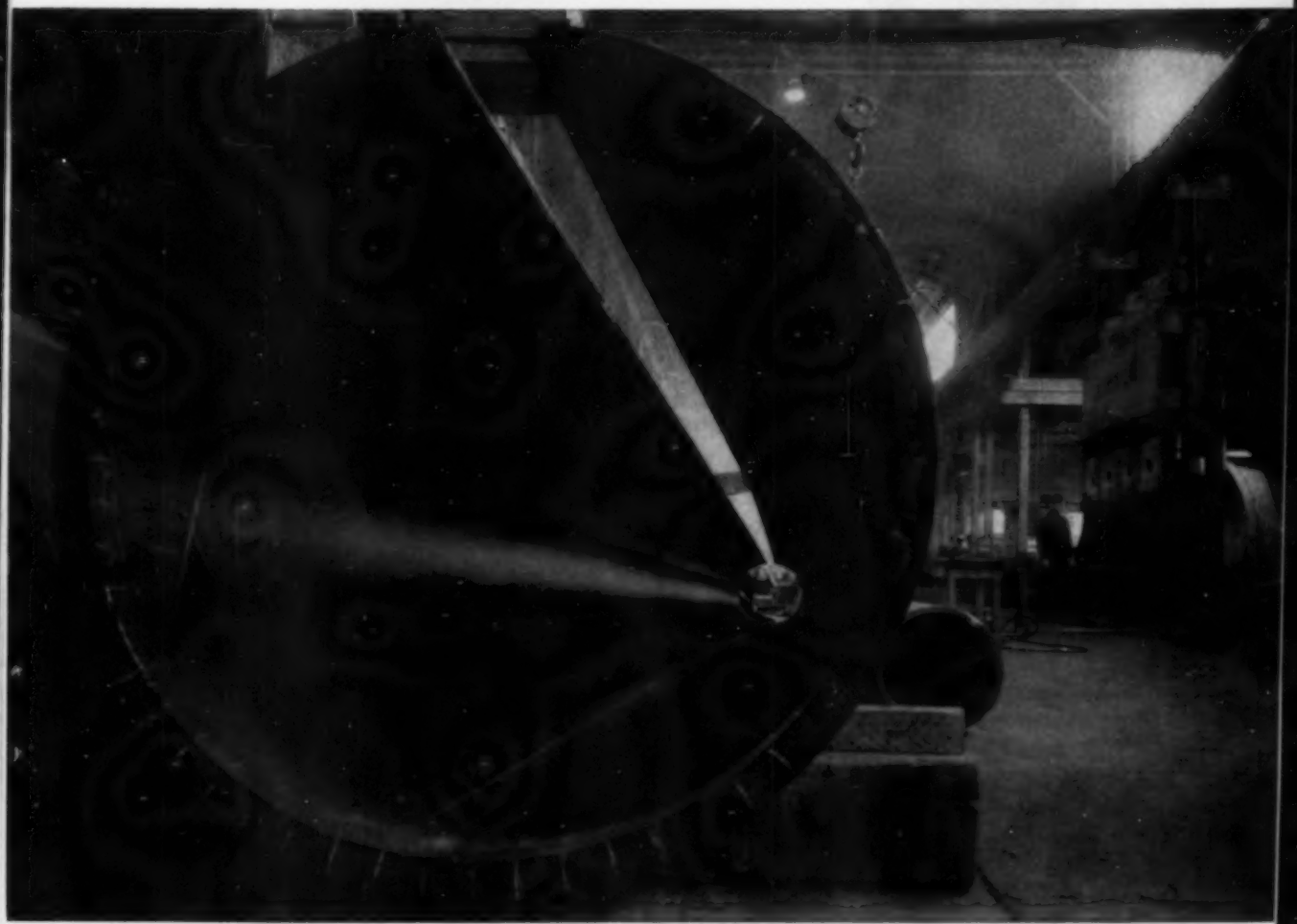
Tubular High-Strength Steel dipper stick is stronger and lighter

The picture shows a plate of High-Strength Steel that has been formed into one of the stiffest, strongest structural shapes known to man: a tube. It will become an amazingly light and tough dipper stick and permit a shovel to operate with greater cycle speed and capacity. In addition, the design and the steel combine to give it tremendous resistance to bending and shock loading, even at very low temperatures.

Both USS* TRI-TEN High-Strength Low-Alloy Steel and USS T-1*, a Constructional Alloy Steel, have been used in the most highly stressed members of many shovels—in booms, crowd members, buckets, bail assemblies and frames. They respectively offer increased yield strengths of about 1½ and 3 times that of structural carbon steel, along with good welding qualities and excellent toughness. Both steels are helping the present-day operator achieve one of his most important goals: to move more and more material at less cost.

When you invest in mining machinery that must do heavy work, specify USS TRI-TEN* or USS "T-1" Steel for faster, longer, more trouble-free operation. Your builder can give you details.

USS Tri-Ten Steel dipper handle during fabrication at National Annealing Box Co., Washington, Pa., for Bucyrus-Erie. Sizes of high-strength and alloy steel dipper sticks made here have ranged up to 40" x 77" with 1.75" wall thickness.



United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS United States Steel

*TRADEMARK

The strongest rack bar makes the strongest jack

The 516 MT has long been a favorite with coal miners. It can raise 5½ tons as much as 9½ inches, is only 16 inches high when closed and has the famous oblong rack bar for greater strength and dependability.

A ratchet jack such as the Duff-Norton all-purpose 516 MT is no stronger than its rack bar—the notched steel bar which moves up and down supporting the load. The forged-steel rack bar on this five-ton capacity mining jack is stronger than the rack bar on any other make. *It's stronger because it's larger.*

Even a brief examination of the jack will confirm the truth of this statement, for the bar on Duff-Norton jacks is oblong, while that of other makes is square.

Ask your distributor for information on Duff-Norton coal mining jacks—there is a Duff-Norton jack for every pulling, pushing or lifting job in the mines. Or, write the world's oldest and largest manufacturer of lifting jacks for a copy of AD-10-J, "A Handy Guide for Selecting Duff-Norton Mine Jacks."

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS
Ratchet, Screw,
Hydraulic, Worm Gear

DUFF-NORTON

COFFING HOISTS
Ratchet Lever
Spur Gear, Electric

Equipment News *(Continued)*

spout and filler opening have double metal wire mesh fire baffles or screens for fire protection. Easy use of the can is assured by a positive-acting valve at the base of the spout. This valve is operated by the free-swing handle to give control while pouring.

Equipment Shorts

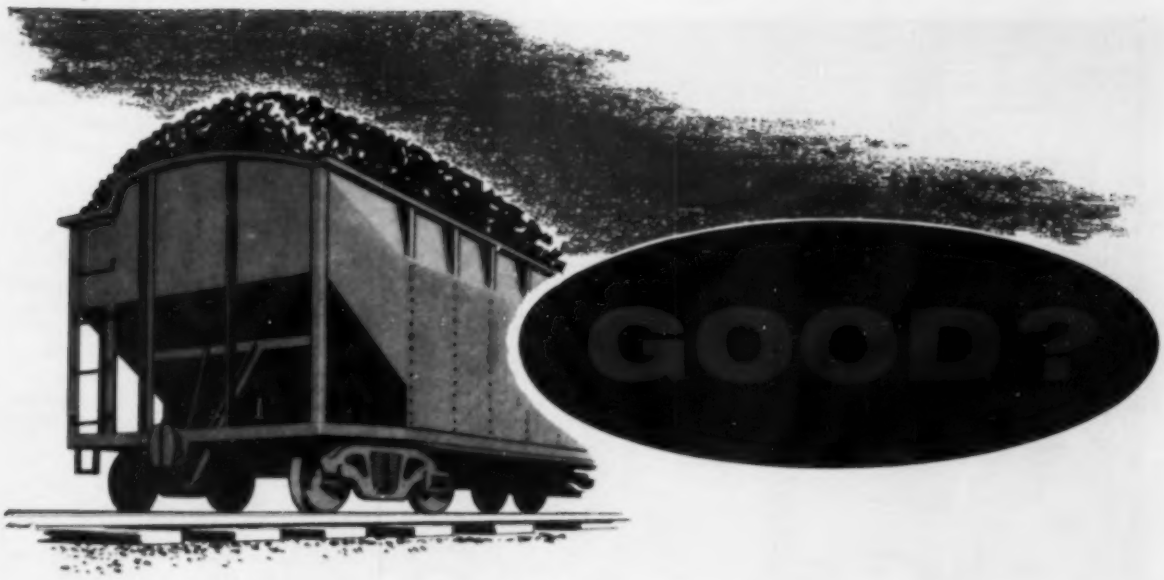
GENERATOR SETS – Allis-Chalmers Mfg. Co., Milwaukee, recently announced a line of 5 to 300 kw engine generator sets. AC or DC sets are available in single or three phase, and 50 or 60 frequency. Drives are diesel, gasoline, butane, or natural gas engines. In addition, a new high-speed synchronous generator is available with diesel engine drive for 30 to 300 kw standby or continuous service.

ALUMINUM TRUCK BODIES – Penn Body Div. of Hockensmith Corp., Penn, Pa. has developed a new line of aluminum truck and trailer bodies. Capacity of the bodies ranges from 8 to 40 cu yds. All models feature telescopic hoists. The hoist is designed so as to apply lifting power directly to the load without the use of cams, levers, arms, or rollers.

GERMAN-BUILT ENGINES – Hercules Motor Corp., Canton, Ohio, has acquired sole American distribution rights to the German-built "Jlo" line of air-cooled diesel and gasoline engines. The engines range from 1 to 33 hp. The new one cylinder engines—featuring cast aluminum cylinder block, crankcase and piston—offer what is believed to be the lowest weight-per-brake-hp ratio of any air-cooled diesels in their size range: less than 16 lb.

SAUSAGE-SHAPED TIRES – Albee Rolligon Co., Monterey, Calif., has started production of its "Arc," an off-the-road truck which travels on pneumatic bags instead of conventional wheels, using a new plastic cab to reduce overall weight by 12%. It can carry a 7 ton payload over rough terrain, sand or snow. The Arc moves on six sausage shaped bags that are friction driven by rollers. Low air pressure—2 to 5 lb—permits the bags to cross obstacles by flowing around them. Air pressure of each bag is controlled from the cab according to the terrain encountered.

MISSING LINKS – Connecting hooks, swivels or rings to chain, or repairing chain, is done quickly and easily with the Missing Link, says Crosby Laughlin Div., American Hoist & Derrick Co., St. Paul, Minn. C-L says the resulting con-



Yes, but not good enough...

Tough competitive markets demand better quality—so this load is not for them!

Only modern preparation plants are equipped with new production techniques that upgrade coal better . . . increase tonnage-flow . . . shrink operating costs for greater profits.

Successful operators are never satisfied with a good product. Make it better with modern ideas . . . modern methods . . . modern equipment by Fairmont!

So be modern . . . go modern . . . modernize . . .

IS AN OUTMODED CLEANING PLANT
CONSUMING YOUR PROFIT DOLLARS?

FAIRMONT
MACHINERY COMPANY

FAIRMONT / WEST VIRGINIA

ENGINEERS • DESIGNERS • FABRICATORS and CONSTRUCTORS

Call Fairmont, W. Va. 1672 and a Fairmont Engineer will consult with you and analyze your facilities for possible cost and savings.

A load of coal emerging from the United Pocahontas Crumpler mine. The first Aeroquip Hose Line was installed in 1949 and is still in operation on hydraulic mining equipment.

"We Use Aeroquip Bulk Hose and Fittings to Replace Hydraulic Lines On The Spot"

Says Maintenance Official, United Pocahontas Coal Company, Crumpler, W. Va.

Deep mines like United Pocahontas' Crumpler bituminous mines cut replacement downtime and simplify fluid line maintenance with Aeroquip Hose Lines. Replacement hose lines are made quickly at the repair shop or right in the mine from a portable inventory of Aeroquip Bulk Hose and Reusable Fittings.

Dependable Aeroquip Hose Lines can help cut costs and downtime on your equipment. The Aeroquip Distributor listed in your Yellow Page Phone Book is ready to assist you. Why not call him today?

Aeroquip Bulk Hose and Reusable Fittings are used to make hose lines as they are needed. Only bench tools are needed.

Mechanic Paul Kirby installs a new Aeroquip Hose Line on the central lube system of the mine service truck.

Aeroquip

AEROQUIP CORPORATION, JACKSON, MICHIGAN

INDUSTRIAL DIVISION, VAN WERT, OHIO • WESTERN DIVISION, BURBANK, CALIFORNIA
AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

Equipment News *(Continued)*

nection is stronger than welding; safer than cold shuts or cast links. The halves of the Missing Links are joined simply by peening together. They are offered in all popular chain sizes.

WEATHERPROOF JOINT SEALANT —Stonhard Co., Philadelphia, has developed a sealing material which reputedly is unaffected by extreme temperatures, expansion or contraction, and is long lasting. The material, called Stonlast, is a specially formulated synthetic rubber compound which doesn't contain oils, which keeps it from oxidizing and becoming brittle, or being deteriorated by corrosive vapors.

Free Bulletins

ROTARY GATES – A technical bulletin on Type G rotary gates for dust collection, pneumatic conveying, and feeding applicat'ons is available from the Ducon Co., Mineola, N.Y. Bulletin V-3558 illustrates and describes the four styles of the type G rotary gates. Also in the bulletin are selection factors, and complete capacity and dimensional information.

FINE GRINDING—Bulletin 0915M58 from Sturtevant Mill Co., Boston, Mass., gives information on Micronizer, a unit for fine grinding. Steam and/or air requirements are included along with schematic drawings of the unit.

OUTDOOR MOTORS – A new line of horizontal, weather protected motors are described and illustrated in Bulletin 2550 from the Louis Allis Co., Milwaukee. Cutaway drawings illustrate motor construct'on impervious to extreme weather conditions. Motors are available in ratings from 250 to 2,000 hp.

ELECTRICAL TUBING – Uses, features, and manufacturing processes of electric metallic tubing by Rome Cable Corp., Rome, N. Y. are detailed in a new 12-page bulletin, RCP-900. The bulletin gives applications, sizes, installation suggestions, and suggested specifications. Durability test results also are given.

ROLLER BEARING CATALOG – A catalog, No. 258, from The Torrington Co., South Bend, Ind. covers five standard series of self-aligning spherical roller bearings. Bore sizes range from 40 to 1,060 mm. The catalog contains complete dimension tables, load ratings, and line graphs showing modifying speed and life factors.

SPEED REDUCERS – Link-Belt Co., Chicago, has issued a new 24-page book

PROFILE OF A TROUBLESHOOTER

You notice engine sluggishness. You see that oil and fuel consumption are on the rise. Time to call in an Amoco mine lubrication engineer!

Mining equipment can suffer lubrication let-down in many ways and for many reasons. Your Amoco mine lubrication engineer has seen the gamut of lubrication problems and has solved them for company after company in the mining industry. He's an expert in his job, a troubleshooter who can help you put your finger on just what's wrong, where and why.

He's a good man to know, a good man to call on for the finest, quality-tested lubricants on the market today. For example, if you notice sluggishness in gasoline or diesel engines, he may recommend a switch to Amoco HDX Motor Oil. Amoco HDX keeps engines clean to reduce oil and fuel consumption. The additives in Amoco HDX assure thorough detergency, added stability, protection against bearing wear and a high resistance to corrosion. That's why Amoco HDX has an enviable record of heavy duty service in both gasoline and diesel engines.

Feel free to call in an Amoco mine lubrication engineer for a survey. It's worth your while to double check and there's no obligation. Contact your nearest Amoco office today or write to American Oil Company, 555 Fifth Avenue, New York 17, N. Y.

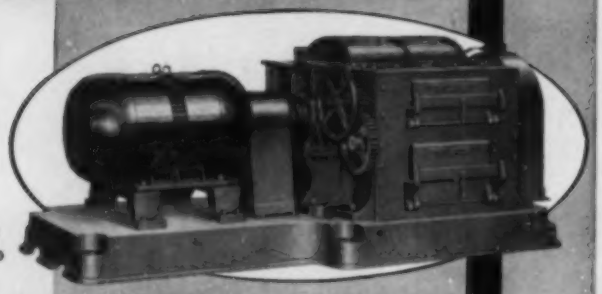
AMOCO LUBRICANTS

FOR MINE MACHINERY

AMOCO

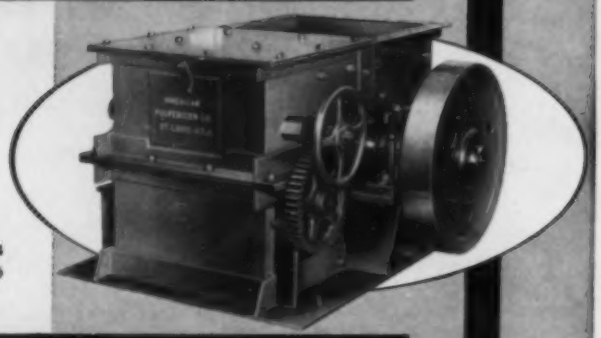
When you want top performance, you want Amoco

When You Figure . . .



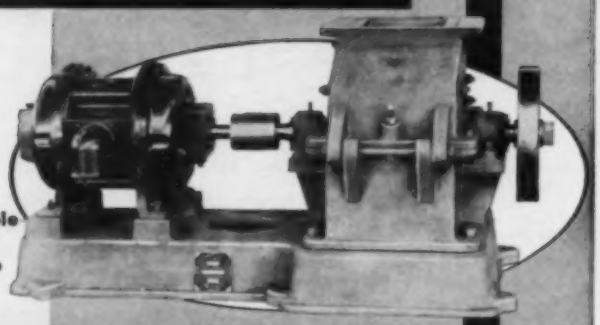
AC Series
capacities to
800 TPH

Reduction
Cost Per Ton . . .



WC Series
capacities to
90 TPH

the Best Answers*. . .



Coal Sample
Crushers
capacities to
2000 Lbs.
Per Hr.

Come from American
Ring Coal Crushers

*In a recent independent survey, it was found that American Crushers reduced over 61,000,000 tons of coal at a parts replacement cost (including standby parts) of *less than 1/10th of 1¢ per ton.*

THERE CAN BE NO BETTER PROOF OF AMERICAN QUALITY!

American
PULVERIZER COMPANY

WRITE for Literature on These Crushers

1119 MACKLIND AVE. • ST. LOUIS 10, MO.

Equipment News *(Continued)*

described its new line of shaft-mounted speed reducers. Book 2618 contains engineering and selection information on single reduction drives in six sizes, with nominal ratios of 5 to 1 and capacities up to 50 hp; and double reduction drives in seven sizes, with nominal ratios of 15 to 1 and up to 40 hp.

CUTTING TOOLS — Information about Carboloy cemented-carbine cutting tool materials is available from the Metallurgical Products Dept., General Electric Co., Detroit, Mich. Listed in the catalog are both positive and negative rake tool-holders, Carboloy cemented-carbide tools, tool bits and inserts.

PROCESS EQUIPMENT — Hardinge Co., Inc., York, Pa., has just published a brochure on its complete line of process equipment. The brochure lists equipment for agitating, mixing, balling, pelletizing, clarifying, wet and dry classifying, cooling, drying, filtering, feeding, flocculating, grinding or pulverizing, separating, and thickening.

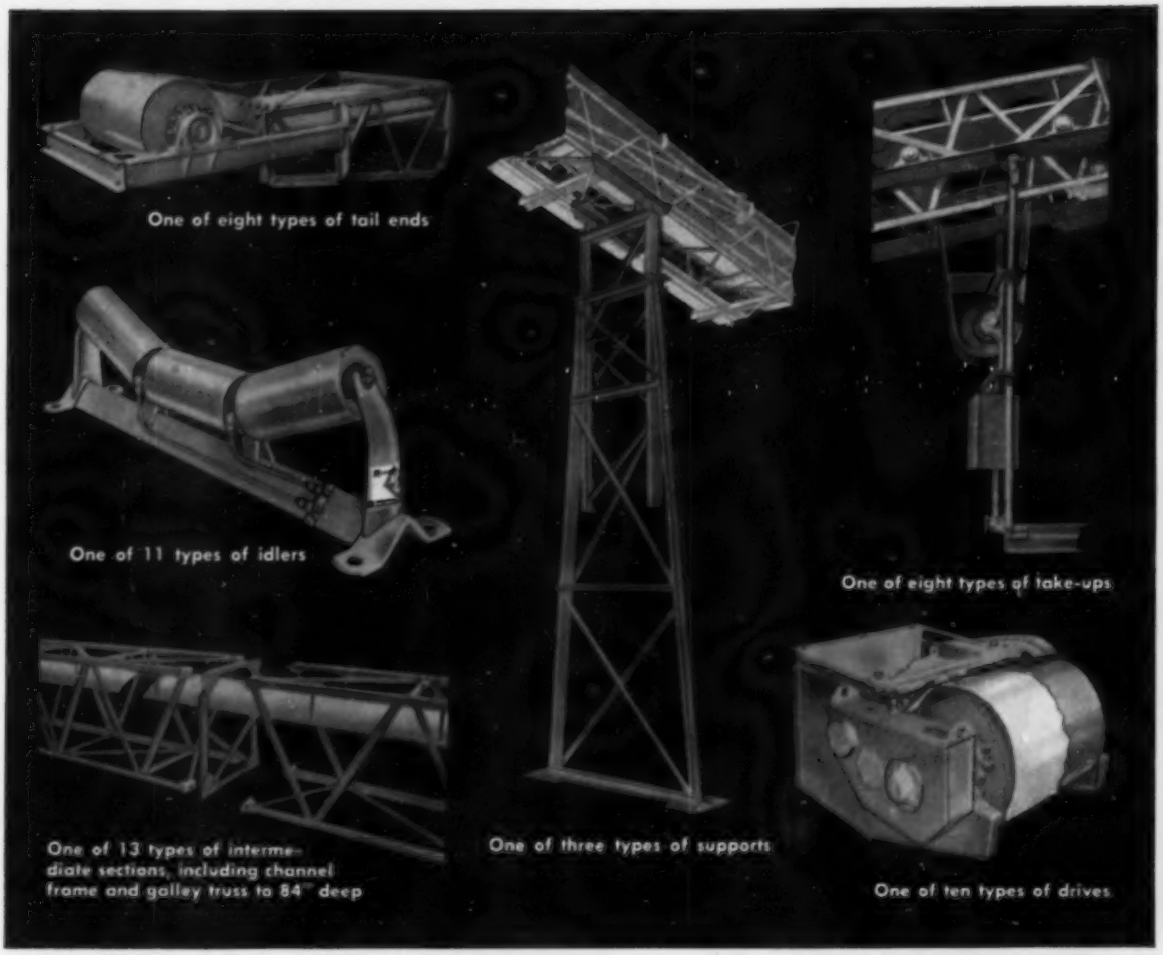
FROTH FLOTATION — Bulletin F10-B37 tells how flotation machines made by Denver Equipment Co., Denver, recover and clean particles of coal from washery rejects and middlings. Bulletin also contains a flowsheet giving typical coal flotation installation.

STEEL CASTINGS — A six-page folder "Farrell-Cheek Electric Furnace Alloy and Carbon Steel Castings," put out by Farrell-Cheek Steel Co., Sandusky, Ohio, describes the company's line of standard and special steel castings. Included are tooth gears, pinions, gear blanks, bar cutters and benders, wheels and rollers, wire rope fittings, and sheaves.

DUST COLLECTOR — Details of the Joy Microdyne dust collector are given in bulletin J-616, Joy Mfg. Co., Pittsburgh. The Microdyne is a wet inertial type collector installed as part of the duct. The bulletin contains performance curves, specifications, and cutaway drawings.

WIRE ROPE BELT CONVEYORS — Jeffrey Mfg. Co., Columbus, Ohio, offers bulletin 948 to describe and illustrate system for low-cost material moving. Illustrations show types of carrying idlers, types of rope stands with return idlers, and installation views.

VIBRATING FEEDERS — Syntron Co., Homer City, Pa., has published a 30-page catalog on its standard and special model electro-magnetic vibrating feeders for bulk materials. Booklet contains complete descriptions, specifications, and installation data.


One of eight types of tail ends
One of 11 types of idlers
One of 13 types of intermediate sections, including channel frame and galley truss to 84" deep
One of three types of supports
One of eight types of take-ups
One of ten types of drives

Pictured here are just a few of the many Barber-Greene standardized conveyor components. Each is available in a wide variety of types and sizes, with unmatched flexibility for countless ways of assembly. Write for new bulletin.

Boost conveyor efficiency and cut costs with Barber-Greene standardized components

Every year, more and more belt conveyor installations — long and short, simple and complex — are made up of Barber-Greene standardized, "packaged" components. This standardization means fast, off-the-shelf delivery . . . almost limitless combinations of assembly that cut time and costs on any bulk material handling job . . . components completely interchangeable . . . spare parts readily available . . . simple selection and pricing right from the catalog. Light or heavy, Barber-Greene has the complete conveyor installation you need.

You save these six ways:

- You save special engineering time and expense.
- You save delivery time.
- You save erection time and expense.
- You save on alignment.
- You save on replacement costs.
- You save down time.

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

58-34-PE

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Among the Manufacturers

American Cyanamid Co.'s new ammonium-nitrate manufacturing plant at New Castle, Pa. has begun continuous operation, thus completing the company's expansion program begun last year.

A company official said the building program has increased the annual manufacturing capacity approximately 60%. Dr. W. H. Bowman, Organic Chemicals Div. manager, said the company expects a continuation of the recent rapid growth in usage of industrial high explosives.

N. V. Chehak is filling the newly-created position of sales manager at Link-Belt Speeder Corp., Chicago.

He is in charge of all domestic and Canadian sales for the firm's line of crawler and rubber-tired shovel-cranes and the related diesel pile hammer equipment.

D. F. Van de Roovaart assumed the new position of assistant sales manager for Link-Belt Speeder's U.S. and Canadian territories.

NEW SPEED AND DRILLING ECONOMY
WITH THE NEW IMPROVED

Parmanco

MODEL CD-51-57

COAL AND CLAY DRILL

- Augers Rotated by Vickers 21.5 H.P. Fluid Motor with Hydraulic Feed Finger Tip Controlled
- Cutting Shield And Guide Completely Automatic
- Drill Powered By 65 H.P. Water Cooled Motor.

Jack Foehrer, Pit Foreman says

"THE PARIS DRILL IS THE BEST WE HAVE EVER USED."

SEND FOR COMPLETE DETAILS

PARIS MANUFACTURING CO. PARIS, ILLINOIS

Lewis C. Black has been appointed manager of domestic sales by Bucyrus-Erie Co., South Milwaukee, Wis.

Mr. Black has been sales manager for large excavators since January, and has previously served as assistant general sales manager of large machines and blast hole drills. He joined the company as a special apprentice in 1953.

James C. Richards, Jr., on Oct. 1 became vice president—sales for B. F. Goodrich Industrial Products Co., a division of The B. F. Goodrich Co.

In his new capacity he succeeds R. V. Yohe, who was recently elected president and chief executive officer of B. F. Goodrich Canada. Mr. Richards joined the company in 1934. His most recent job was as vice president—sales of the B. F. Goodrich Chemical Co., which he assumed in 1952.

Howard B. Cary has been appointed director of the newly-established Hobart Brothers Technical School in Troy, Ohio.

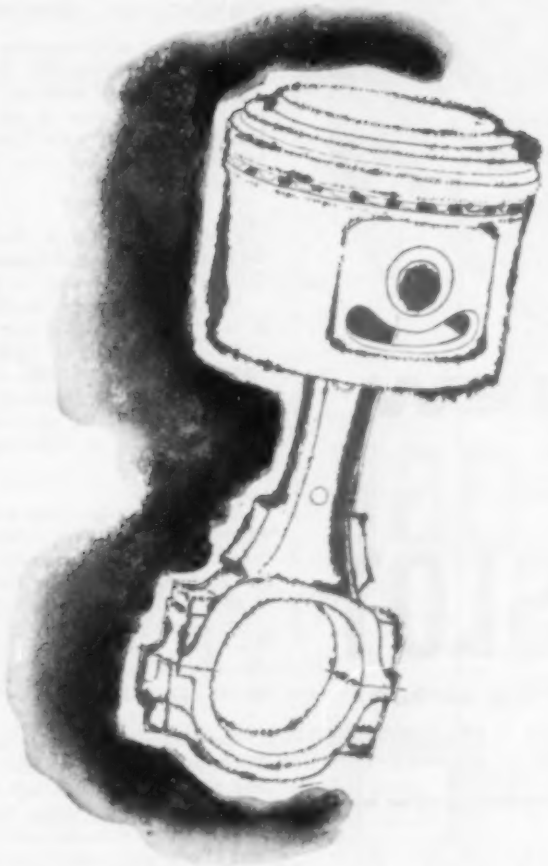
The school, established this year by the Hobart Brothers Co. of Troy, is a non-profit school devoted to teaching, research, and development in the welding field. To take the new position, Mr. Cary resigned his position as assistant general works manager for Marion Power Shovel Co. He had been with the company since 1948.

Alvin E. York is filling the newly-created post of sales manager in the Construction Machinery Div. of Clark Equipment Co., Buchanan, Mich.

Mr. York formerly was manager of parts and service. He joined Clark in 1956 after 14 yr with Link-Belt Speeder Corp.

Wendell V. Richards, former product specialist manager for Clark, is filling the also newly-formed post of assistant sales manager.

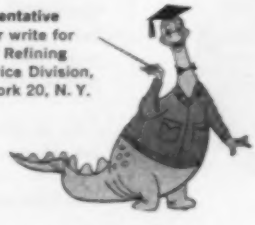
M. Bruce Mairs is product manager of the newly-formed Minerals Dressing



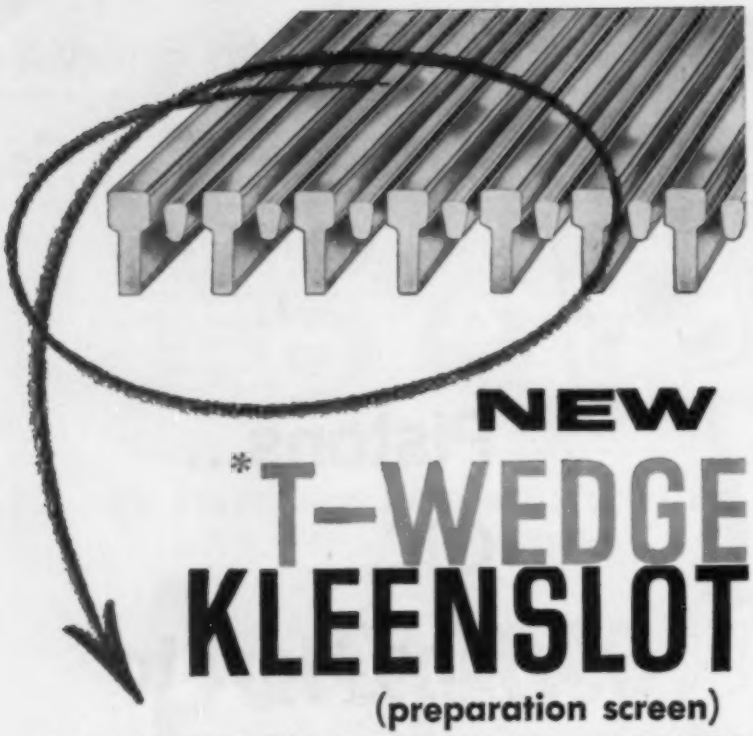
Pistons... Oil... and How to Save Money

The longer your pistons work before need of ring replacement—the less your cost of operation. Sinclair Tenol® Oils have the reputation for giving longer service to cylinders, rings and other vital parts. Refill with Tenol now. Next time management asks how you've cut costs, tell them you've switched to Sinclair—and show them the results.

Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.



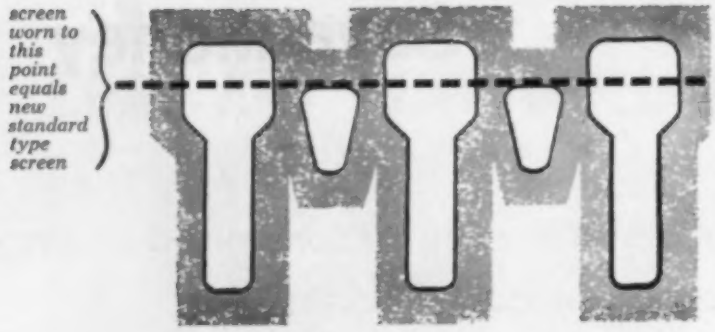
SINCLAIR
Tenol® Oils



NEW

*T-WEDGE KLEENSLOT

(preparation screen)



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Wellington, Ohio

**patent applied for*

Manufacturers *(Continued)*

Dept., Mining & Construction Div., Joy Mfg. Co., Pittsburgh.

For the past two years Mr. Mairs has been district manager of the Montreal branch of Joy Mfg. Co. Ltd. He also has served as manager of the Vancouver branch.

J. M. Childs and S. F. Madden have been appointed assistant managers, Steel Sales Div., Firth Sterling Co., Pittsburgh.

Mr. Childs will be responsible for sales of high speed steel, tool bits, drill rod, ground flat stock, and shank steel in addition to his job of sales manager of zirconium alloys. Mr. Madden will be in charge of tool-and-die steel sales in addition to his job as metallurgical engineer.

Jay C. Failing has been named chief sales representative for a new line of rotary earth-drilling equipment scheduled for production by Mobile Drilling Inc., Indianapolis, Ind.

Mr. Failing formerly was with the George E. Failing Supply Co. as exclusive sales representative for western U. S. and Mexico.

The Clinton, Mass. plant facilities of Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp. will be moved to the company's Palmer, Mass. plant.

A company statement said the move, part of a modernization program, would afford more centralized control, increased efficiency, and more satisfactory customer service.

David E. McDowell has been named Tire Sales Div. manager, Gates Rubber Co., Denver, Colo.

Joining the company less than two years ago, Mr. McDowell came to Gates as manager of truck tire sales. He formerly was manager of the tube and tread rubber sales division of the Polson Rubber Co.

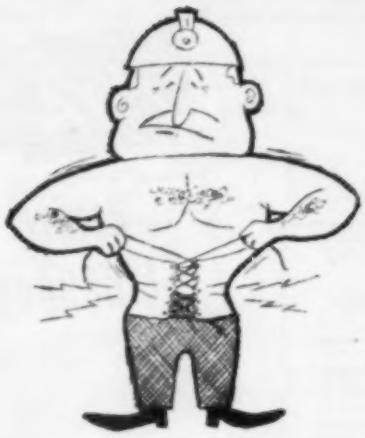
Gates Rubber Co., Denver, has announced plans for spending almost a half million dollars on new warehouse and storage construction.

The program includes a new 35,000 sq ft warehouse at Charlotte, N. C.; a one-story brick-veneer warehouse at Cleveland, Ohio, and a carbon black storage building in Denver.

Edwin H. Johnson, manager of the Mining Tool Div., Kennametal Inc., has been named consultant in the development and marketing of new company products in the mineral industries field.

C. B. Hunt & Son, Inc., Salem, Ohio has changed its name to Hunt Valve Co. The company manufactures air and hydraulic control valves.

Tight Maintenance Budget?



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3—Joy 14-BU Loaders, low pedestal, 7AE.
2—Joy 14-BU Loaders, medium pedestal, 7BE.
1—Joy 14-BU Loader, high pedestal, 7BE.
2—Joy 12-BU Loaders, 9E, latest type.
1—Joy 12-BU Loader, 220 volt AC.
1—Joy 20-BU Loader, latest type.
1—Joy 11-BU Loader, latest type.
2—Joy 8-BU Loaders, 250 volt DC.
1—Joy 8-BU Loader, 34" overall height.
2—Joy 8-BU Loaders, 220 volt AC.
1—Joy curved Bar Head, complete
6—Reliance 24-J Motors, 7½ H.P.
4—Reliance 10-J Motors, 5 H.P.
20—9-J Motors, 4 H.P.
6—New Wheel Units for Joy 6SC Shuttle Cars.
1—Goodman 660 Loader on cats, excellent.
1—Goodman 665 Loader on cats, latest type.
1—Goodman 865 Loader, 26" hi.
2—Joy 8SC Shuttle Cars, rebuilt.
2—Joy 6SC Shuttle Cars, rebuilt.
2—Joy 5SC Shuttle Cars, rebuilt.
2—Joy 32E9 Shuttle Cars.
2—Joy 32E10 Shuttle Cars, rebuilt.
2—Joy 32E15 Shuttle Cars, rebuilt.
1—Joy 32E16 Shuttle Car, rebuilt.
2—Joy 42E16 Shuttle Cars, rebuilt.
3—Joy CD-22 Drills, like new.
4—Joy T-2-5 low pan Cat Trucks.
1—Joy T-2-6 low pan Cat Truck with reel.
2—Joy T-1 Standard Cat Trucks, 220 AC.
1—Joy T-1 Standard Cat Truck, 250 DC.
2—Joy 11-B Cutting Machines, like new.
1—Joy 7-B Cutting Machine, like new, 250 volt DC.
2—Joy 7-B Cutting Machines, 220/440 volt AC.
1—Goodman Machine on Cats, 31" high. All hydraulic.
6—Goodman 512 Machines with Bugdusters.
1—Goodman 512 Cutting Machine, perfect.
4—Goodman 512 Cutting Machines, 220/440 volt AC.
3—Goodman 112 Cutting Machines, 220/440 volt AC.
1—Lee Norse low vein Machine Carrier on rubber.
1—Jeffrey 70 URB, rubber-tired Cutter, Universal head, perfect condition.
1—Joy 10RU Rubber Tired Cutter, first class.
1—Joy 11RU, rubber tired Cutter with bugdusters, Universal head, like new.
2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on cats, 250 volt DC.

LOCOMOTIVES

1—Goodman, 17 ton, type 165, 30" hi. air brakes, 42" to 48" ga, like new.
3—Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
2—Jeffrey 10 ton, type MH-110, 42" and 44" Ga.
1—Jeffrey MH-124, 6 ton, 24" overall h-ight.
12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
2—Jeffrey, 8 ton, type MH-100, 2" armor plate frames.
1—Jeffrey, 6 ton, type 2186, 22" above rail.
3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
1—G.E., 4 ton, type 825 Locomotive, 22" high.
10—G.E., 6 ton, tynes 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E., 8 ton, type 822 Locomotive, 44" Ga.
3—G.E., 10 ton, type 809 Locomotive, 42", 44" and 48" Ga.
2—Goodman, type 33, 6 ton, 44" and 48" Ga.
3—Goodman, 8 ton, type 32A, 36", 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
8—Jeffrey MH-78 Locomotive Units, cheap.
3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" Ga.
4—Jeffrey MH-88 Locomotive Units, real bargains.

LOCOMOTIVES (Cont.)

6—Jeffrey MH-100 Locomotive Units, reasonable.
Locomotive Trucks and Spare Armatures for all the above.

TIPPLE EQUIPMENT

1—Cedar Rapids portable super Screening Plant.
1—Complete 5 track tipple with washer.
1—Allis Chalmers 5'x14' Ripple Vibrator.
1—5'x14' Robins double deck Vibrator.
1—4'x10' Robins Gyrex Vibrator.
1—Roberts & Schaefer tandem Hydro-Separator.
Belt Loading Booms.
1—Robins Car Shakeout.
10 Crushers, various sizes.
Feeders, Drag Conveyors and Loading Booms

CUTTING MACHINES

1—Joy 11RU, rubber tired, Cutter.
1—Joy 10RU, rubber tired, Cutter.
1—Jeffrey 70 URB Cutter, rubber-tired, Universal Head, low vein.
2—Jeffrey 29UC Universal Machines on Cats.
1—Goodman on cats, 31" overall height.
3—Baby Goodman 212's, rebuilt, 250 volt DC.
1—Goodman 312, 18" high.
6—Goodman 512's with Bugdusters, like new.
4—Goodman 512's, rebuilt, or as removed from service.
4—Goodman 512's, 220/440 volt AC.
3—Goodman 112's, 220/440 volt AC.
2—Joy 7-B Cutting Machines, 220/440 volt AC.
2—Joy 11B Cutting Machines, rebuilt.
6—Goodman 12AA's and 112AA's, 250 volt DC.
2—Goodman 324 Slabbers.
2—Goodman 724 Slabbers.
6—Jeffrey 35L's, like new, 17" high.
2—Jeffrey 35L's, on low vein trucks.
1—Jeffrey 35L, 220 volt AC.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29Bs' on track.
2—Jeffrey 29C's track mounted.
2—Jeffrey 29L's on track, perfect.
2—Sullivan CR-10's, 13" high.

LOADING MACHINES

16—Joy Loaders all types.
1—Goodman 865 Loader, 26", on cats.
1—Goodman 665 Loader, on cats.
1—Goodman 660 Loader, on cats.
1—Goodman 460, rebuilt.
2—Jeffrey 61 CLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3 Automat Loaders.
2—Clarkson Loaders, 26" above rail.

CONVEYORS

2—Joy 30" Underground Belt Conveyors, 500' to 2000' each. Excellent.
1—Barber-Greene 30" Belt Conveyor, 350', Excellent.
1—Robins 30" Belt Conveyor, 500'.
1—Jeffrey 52-B, 26" Conveyor, 1200' each.
1—Jeffrey 52-B, 30" Drive and Tail Assembly, complete.
3—Robins 26" tandem drive Belt Conveyors, 1,000' to 2,000' long. Excellent condition.
2—Joy MTB 30" Drive and Tail Assembly, complete.
1—Goodman 97 HC 30" Drive and Tail Assembly, complete.
3,000' Conveyor Belt, 30".
10,000' Conveyor Belt, 26", like new.
2—61EW Elevating Conveyors.
2—61WH 15" Room Conveyors, 300'.
2—Joy 15" Room Conveyors, 300'.
2—Joy 20" Conveyors, 300'.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
2—Long 400 DBH 15" Chain Conveyors, 25 H.P. Motors, new.

CONVERTERS AND DIESEL PLANTS

2—100KW, G.E. TCC-6's, 275 volt, Rotary Converters.
1—150KW, G.E. HCC-6, 275 volt, Rotary Converter.
1—150KW, 6 phase, Allis Chalmers Rotary Converter, 275 volt DC, perfect.
1—200KW Allis Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
1—200KW, G.E. HCC-6 Rotary Converter, 275 volt DC.
1—300KW, G.E. HCC-6 Rotary Converter, 275 DC.
2—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
1—375KW Westinghouse Rotary Converter, 275 volt.
2—500KW Westinghouse Rotary Converters, 275 volt DC.
2—200KW Westinghouse Rotary Converters, 275 DC.
(all the above with 6900/13000 and/or 2300/4000 primary transformers)
2—150KW MG Sets, General Electric and Westinghouse.
1—200KW MG Set, Westinghouse, rebuilt.
1—200KW MG Set, General Electric, perfect.
2—150KW Allis Chalmers MG Sets, 275 DC volt, excellent, 220-440 AC volt.
1—300KW Westinghouse, 600 volt MG Set, rebuilt.
2—300KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
2—500KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
2—500KW HCC-6 Rotary Converters, 6 phase, 600 volt DC.
1—Cummins 125 KW, Diesel with 250 volt DC Generator.
1—Allis Chalmers Natural Gas Engine with 100KW Generator, 275 volt DC.
1—700 H.P. Shaft Hoist, complete.
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2—All Steel Armco Building, various sizes.
20—Jeffrey Motvoyers on rubber tires.
1—¾ Yard Shovel and Back-Hoe.
1—¾ Yard Crane on Cats.
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10—Air Compressors, 1 H.P. to 40 H.P.
2—Joy self propelled rubber tired compressors, 240 cu. ft.
2—Arms self propelled rubber tired compressors, 130 cu. ft.
40 Mine Pumps, all types.
1—Differential 40 Passenger Man-Trip Car.
6—MSA Rock Dusters.
2—Phillips Carriers, 44" and 48" Ga.
2—Barber Greene self propelled Bucket Elevators.
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100 Mine Cars, 18" high, end dump, 44" Ga.
300 Mine Cars, end dump and drop bottom, 20" high, 48" Ga.
1—10 ton Mine Car Scale with Recorder.
15—Brown Fayro HKL and HG Car Spotters.
1—12 ton Differential Slate Larry.
Incline Hoists, 25 to 50 H.P.
1—Jeffrey 5' Aerodyne Fan, like new.
1—Jeffrey 6' Aerodyne Fan.
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1—Viking Hot Vapor Process Oiling System complete, model E8PU 200-13 and E8PU 300-20.

CRUSHERS

1—Jeffrey single roll crusher, 36 x 45. New in 1950 and is just like new. It is a standard single roll crusher complete with 100 HP ball bearing enclosed slip ring motor, new type.
2—Jeffrey 36 x 36 single roll crushers, just as good as new.
1—Jeffrey 36 x 36 Jeffrey Flextooth crusher, late type.
2—18 x 18 Jeffrey single roll crushers, perfect condition. One crusher has a new set of segments.
1—American Pulverizer AC3E crusher, late type, like brand new complete with roller bearings, serial #1737.

FANS

1—7' Joy Aerodyne fan, type H-111-36.
1—5' 8H-60 Jeffrey Aerodyne Fan.

LOADING MACHINES

3—8BU DC Joy machines, complete with new type controls and permissible tags.

LOCOMOTIVES

3—15 ton MH74 Jeffrey locomotives, 42" ga. ball bearing armatures, ready to go to work.
2—8 ton MH78 Jeffrey locomotives, 48" ga. ball bearing armatures, and ball bearing journals.
6—6 ton MH88 Jeffrey locomotives, 42" ga. ball bearing. Complete with or without gathering reels. Overhauled, just as good as new.
3—15 ton Goodman locomotives, 42" ga. type 36A04C4, ball bearing armatures, overhauled just as good as new.
1—10 ton Goodman locomotive, 42" ga. type 29A-0-4-C, complete with ball bearing armatures. Overhauled ready to go to work.
2—8 ton Goodman tandem locomotives, 42" ga., ball bearing. Can be used either single or in tandem, type 31-1-4-T.

MINING MACHINES

Several 7-B1 Sullivan new type machines, 250 volts DC complete with 8½' cutter bars ready to go to work.

MOTOR GENERATOR SETS

4—Allis Chalmers new type 200 KW motor generator sets. These sets were bought in 1948 and were only used a short time. They are beautiful sets and the specifications are as follows: DC end 250-275 volts, 723 amps, compound wound, 1200 RPM, direct connected to 300 HP Allis Chalmers synchronous motor, 3/60/2300 volts, 1200 RPM, complete with Clark fully automatic AC and DC enclosed portable controls. Just like brand new.
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TRANSFORMERS

2—1500 KVA Maloney transformers, primary voltage 23,000, secondary voltage 2300/460, 3 phase, 60 cycles, type TC-3.
3—250 KVA Standard transformers, single phase, primary voltage 23,000 low voltage, 6900/11950Y, new in 1946.
3—75 KVA Gregory Electric transformers, single phase, 60 cycles, primary voltage 4000, low voltage 2300.

SHUTTLE CARS

1—42E-9 Joy Shuttle Cars, 250 volts DC, stationary elevated discharge completely rewired and all new parts put in where needed and motor checked. Good tires. Runs like new car.
2—42E-18 Joy shuttle cars, 250 volts DC, hydraulic elevating discharge, complete with new type airplane brakes. Excellent condition. One right and one left hand drive. Bought in 1950.

BOILERS

1—Kewanee Type C compact firebox boiler, size 7L88, 881 rating 30,300 sq. ft. of steam radiation, 881 net rating of steam in 25,000 sq. ft. heating surface of 1746 sq. ft., built for 15# steam 30# water, low pressure boiler, nominally rated at 217 HP.
2—Fire Box, Kewanee boilers, 48" in diameter by 10'11" long, 15 lbs. steam and 30 lbs. water. They have 39 tubes, 7'7" long and 3" in diameter. 286 sq. ft. heating surface equal to 30 HP each.

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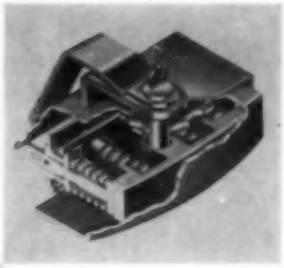

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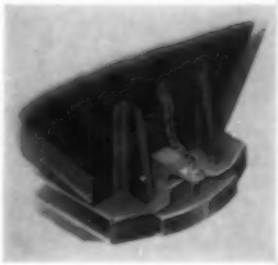

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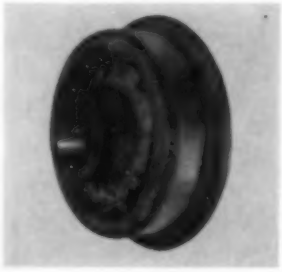

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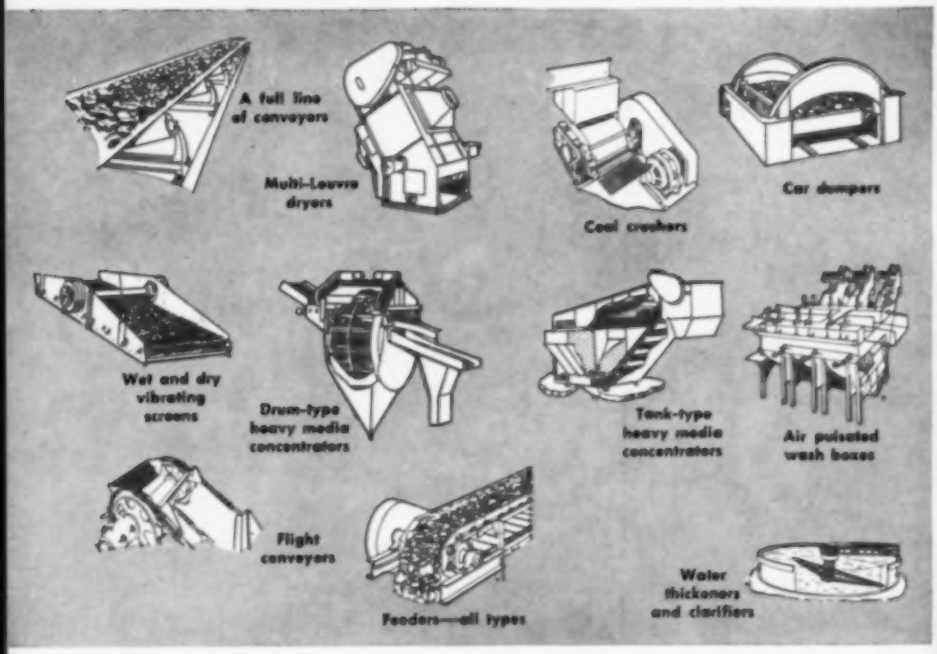

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